X

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REVIEW

OF

FOREST ADMINISTRATION

IN

BRITISH INDIA

FOR THE YEAR

1890-91.

BY

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REVIEW

OF

FOREST ADMINISTRATION IN BRITISH INDIA

FOR THE YEAR 1890-91.

THE progress made in the administration of the State forests under the control of the Forest Department during 1890-91 may be considered satisfactory.

CHAPTER I.

EXTENSION AND ORGANIZATION OF THE FOREST AREA.

I.—Alterations of Area.

2. The area under the administration of the Forest Department has ncreased during the year to 112,608 square miles, which is somewhat in excess of the total area contained in the North-Western Provinces and Oudh; but of this vast area only 57,301 square miles are finally settled and reserved. The balance consists partly of protected and partly of unclassed forests. These latter classes of forests are doubtless also the property of the State, but many of the lands included in them are still subject to the exercise of more or less undefined and increasing rights, and can hardly be deemed permanent State property until they have undergone the process of settlement and reservation.

The following table, which exhibits the distribution amongst the several Provinces of the area under the control of the Forest Department, shows that, though the total area of forest amounts to 13 per cent. of the Empire, it is very unevenly divided; for, whereas Bengal, the North-West Provinces, and Lower Burma, with their large cultivated alluvia, and the Punjab, with its extensive doabs, contain only between 4 to 8 per cent. of areas declared to be State forests, the Central Provinces, Upper Burma, Assam, Coorg, Berar, and Madras, intersected as they are by numerous hill ranges which occupy a large portion of the country, show a percentage of State forests much above the general average :—

Province.		Forest area, in square miles				Proportion of Forests to whole area of Province.	Remarks.
Name.	Area, in square miles.	Reserved.	Protected.	Unclassed State.	Total.		
						Per cent.	
Bengal . . .	150,717	5,189	2,209	4,034	11,432	8	
North-Western Provinces and Oudh.	107,441	*3,602	94	132	3,828	4	*Includes 78 square miles of *Leased* Forests.
Punjab . .	106,613	†1,694	354	‡3,916	5,964	6	† Includes 321 square miles of *Leased* Forests.
Central Provinces .	86,501	19,680	...	393	20,073	23	‡ Includes 255 square miles of *Leased* Forests.
Burma (Lower) .	87,220	§5,603	...	...	5,603	7	§ Includes 461 square miles of *Taungya* areas.
Burma (Upper) .	77,296	35	16,014	35	16,084	21	
Assam . . .	45,350	3,602	916	5,470	9,988	22	
Coorg . . .	1,583	247	609	...	856	54	
Ajmere . .	2,711	140	...	‖8	148	5	‖ This area, which is not brought under the Ajmere Forest Regulation, is managed by the Ajmere Forest Department.
Baluchistan . .	...	78	...	...	78	...	
Andamans . .	1,989	...	...	1,957	1,957	98	
Total .	667,421	39,870	20,196	15,945	76,011	¶11	¶ Baluchistan left out of account.
Berar . . .	17,711	2,149	...	2,136	4,285	24	
Total Bengal Presidency.	685,132	42,019	20,196	18,081	80,296	¶12	** Exclusive of the areas of Feudatory and Tributary States, Zemindaries and whole Inâm villages.
Madras . .	**84,575	††5,112	‡‡11,435	1,276	17,823	21	†† Includes 37 square miles of *Leased* Forests.
Bombay . .	124,352	10,170	4,319	...	14,489	11	‡‡ Includes 153 square miles of *Leased* Forests.
GRAND TOTAL	894,059	57,301	35,950	19,357	112,608	¶13	

In several provinces extensive tracts of waste lands still exist, which, though they belong to the State, have not as yet been brought under the control of the Forest Department, or under any other systematic control. There are no means at the disposal of the Local Governments by which a conservative management of such lands can be secured as effectively and with such perfect justice to all parties interested as by reservation under the Forest Act, and the reason why this course has not been more widely followed lies presumably in the fact that all State lands finally settled under the Forest Law are denominated "Reserved Forests," and in the belief which arose, as a natural consequence of this name, that the Local Governments would utilize such areas only for purposes of forestry. This, however, is not the case, and it rests with local authorities to use their settled State lands in any way they may consider most advantageous to the general welfare of the people and to the revenues of the State, so long as such use does not interfere with vested rights on the one hand, or with the proper maintenance of the forests on the other. In order to enable them to gauge with greater certainty the advantages of a wider application of the procedure for the settlement and reservation of State lands, the Government of India have issued, during the present year, an important Circular, No. 17—105 (Agri.), dated 15th July 1891, asking Local Governments to analyze the State lands district by district, and to classify them in accordance with the main purposes which they should serve, and for which they should be systematically treated.

There is no doubt that under the idea that Reserved Forests were intended merely for the growth of timber and fuel, only such areas were as a rule selected and reserved as either answered that purpose or were considered necessary for the protection of hill-sides and the underlying cultivation dependent on such protection. Nevertheless, it is quite possible that areas were included, especially during the earlier period of reservation, which are fit for permanent and self-supporting cultivation, such as would require no support in the shape of forest rights or other concessions over land outside the limits of the cultivated area. Under these circumstances, provided the forests are sufficiently extensive to meet the demands made on them for forest produce, and are not required for protective purposes, there is no reason why such lands should not be let out for cultivation, or be even alienated; for it is in the interest of the State revenues and the forest administration to develop and increase the local markets for the consumption of forest produce. The importance and value of fodder reserves created for that purpose are largely increased by their proximity to cultivated areas. Such supply not only a market for the produce of the reserve but the labour necessary for the cutting and gathering of the crop. Every forest area, closed against grazing, may be used as a fodder reserve as soon as the young tree-growth has sufficiently advanced in size to escape being cut with the fodder grasses. Areas should only be classed as *bonâ fide* pastures, which either bear no forest growth for climatic reasons, or the protection or afforestation of which is of no consequence to the surrounding country. In connection with the pastoral requirements of agricultural communities two facts must always be kept in view, the first being that such requirements can to a great extent be met from State lands, even under a sylvicultural treatment, by keeping open to grazing a certain portion, varying according to circumstances between 30 to 60 per cent.; the second, that with the advance in agriculture, and consequent increase in the culture of fodder crops which occurs in every peaceful and well-administered country, the demands on pastoral lands and forest-grazing diminish.

8. The following table exhibits the alterations which took place during the year under notice in the area controlled by the Forest Department, and shows a net increase of 6,978 square miles :—

Province.	Alterations in area, in square miles, during 1890-91.								Remarks.
	Reserved Forests.		Protected Forests.		Unclassed State Forests.		Total.		
	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.	
Bengal . . .	...	6	...	30	...	...	...	36	
North-Western Provinces and Oudh . . .	87	76	27	...	...	...	114	76	
Punjab . . .	...	...	...	4	2	6	2	10	
Central Provinces . .	566	594	...	.	77	2	643	596	
Burma (Lower) . .	59*	30	..	...	...	...	59	30	*Includes 31 square miles of *Taungya* areas.
Burma (Upper) . .	35	...	7,024	124	35	...	7,094	124	
Assam . . .	129	...	4	20	13	140	146	160	
Coorg	6	...	...	6	...	...	6	6	
Ajmere . . .	1	...	...	...	...	...	1	...	
Baluchistan . . .	39	...	...	...	...	...	39	...	
Andamans . . .	...	...	...	...	...	2	...	2	
Net Total Increase or Decrease . . .	216	...	6,871	...	...	28	7,064	...	
Berar	77	...	...	...	144	252	221	252	
Net Total Increase or Decrease, Bengal Presidency . . .	293	...	6,871	...	...	181	7,033	...	
Madras . . .	1,411	37	649	1,542	186	387	2,246	1,966	
Bombay . .	189	†358	...	166	...	...	189	524	† Of this, 330 square miles, in the Northern Circle, represent rectifications of area.
Grand net Total Increase or Decrease .	1,498	...	5,812	...	...	332	6,978	...	

Bengal.—No material alteration in the area of Reserved or Protected forests occurred during the year under review. There was a decrease of 6 square miles in the area of Reserved, and of 30 square miles in that of Protected forests. Both were due to the extension of permanent cultivation. At the close of the year the province contained 5,189 square miles of reserves, of which 183 square miles were under settlement. The area of Protected forests aggregated 2,209 square miles, and that of Unclassed forests under the management of the Forest Department, 4,034 square miles.

North-Western Provinces and Oudh.—The changes in area were unimportant, amounting only to increases of 11 square miles of Reserved and 27 square miles of Protected forests. The total forest area under the control of the Department was 3,828 square miles at the close of the year. It was noticed by the Government of India that the Administration Reports take no account of Government forests not under the control of the Department, and the Local Government has been requested in future to furnish information regarding all forest and pasture lands at the disposal of the State.

Punjab.—The gross area of Reserved forest remained practically unchanged during the year under review. A net exclusion of 8 square miles was made from the Protected and Unclassed areas. An area of 15,614 acres in the Lahore District, transferred as fodder-reserves to the Military Department, was constituted Reserved forest during the year. It was in contemplation to establish, in lieu of the existing forest adjoining the Chenab canal, much of which

will be granted for cultivation, an irrigable block of 20,000 acres on the plan of the Changa-Manga plantation.

Central Provinces.—A net exclusion of 28 square miles was effected from the area of the Reserved forests, which amounted at the close of the year to 19,680 square miles. An area of 75 square miles was added to the Unclassed forests. In reviewing the administration of the year, the Supreme Government drew attention to the possible restrictive influence which the retention of large tracts under forests might have upon the extension of permanent agriculture.

Lower Burma.—The area of the reserves was increased during the year by a net addition of 29 square miles.

Upper Burma.—The actual increase in the area of regularly constituted Reserved forests during the year amounted to 35 square miles. The large area of 1,394 square miles was, however, under settlement, while an additional 1,800 square miles was notified for enquiry with a view to reservation. Since the annexation of the province, 16,000 square miles of forest had been systematically examined, and active progress was made during the year towards reservation of areas.

Assam.—Additions to the reserved area, aggregating 129 square miles, were made during the year. No disafforestation of areas already reserved took place. Exclusions from the total area of Protected and Unclassed forests amounted to 143 square miles. These exclusions were principally due to the reservation of the same areas.

Coorg.—A satisfactory extension of the State forest property was effected during the year, 6¾ square miles having been added to the area of the Reserved forests, and the first steps were taken in the direction of a further and very considerable extension. The areas constituted reserves during the year were taken from the Protected forests.

Ajmere.—The additions made to areas controlled by the Forest Department were unimportant, amounting in all to 180 acres. One village reserve, 70 acres in extent, was formed during the year. It is matter for regret that it has not hitherto been found possible to extend in a more marked degree the area of such reserves. Progress of this kind is perhaps the most important which can be made in the local forest administration. But the advantages which must accrue to the pastoral population of the country from an active extension of the policy in this respect which was inaugurated in 1889-90 are fully understood, and there is reason to believe that strong efforts will be made to educate the people up to the conviction that the preservation of their forests is necessary in their own interests. A draft regulation for the management and protection of these forests was under consideration at the close of the year.

Andamans.—The area of the forests, with the exception of 2 square miles which were cleared for cultivation and other purposes, underwent no change during the year. The selection and delimitation of special tracts to be permanently retained and exploited as timber or fuel forests, was not undertaken, but this very important work would, it was stated, be commenced during 1891-92.

Baluchistan.—Powers under the Baluchistan Forest Law and Regulation for the extension of regularly constituted State forests were utilized for the first time during the year. Very satisfactory and prompt progress was made, the area of forests under the control of the Forest Department having been doubled, the total extent being 78 square miles at the close of the year. Notifications under the above mentioned Acts were also issued reserving certain classes of trees, and providing generally for the working of the regulations which appear to have been introduced with discretion, the people proving themselves amenable to restrictions hitherto unknown to them.

Berar.—The area of demarcated State forests was increased during the year by 77 square miles, of which 75 were drawn from Unreserved forests and 2 were due to re-computations. There was no alteration in the extent of the District Reserves. The District Unreserved forests gained 20 square miles by the resumption of abandoned cultivation, while 75 square miles were, as noted above, transferred to demarcated State forests. The alterations resulted in a net reduction of 108 square miles.

Madras.—The total extent of forest land under the control of Government amounted to 17,823 square miles at the close of the year under review. Of this area, 5,112 square miles are reserves, the addition to this class of forest during the year having been 1,411 square miles, of which 1,374 were finally notified under section 16 of the Act, and 37 are understood to be due to rectifications of area. Of the areas classed as "reserved lands," 6,467 square miles had, at the close of the year, undergone settlement but had not been notified as reserves, while 2,562 square miles were under settlement.

Bombay.—The annual reports for Bombay show a decrease of 169 square miles in the area of reserves, but as 330 square miles represent corrections in former statements, an actua

increase of 161 square miles took place. The area of Protected forests, amounting to 4,319 square miles, forms still a considerable portion of the total area of State forests which extends in all to 14,489 square miles.

II.—Forest Settlements.

4. Great strides in forest settlement have been made in Madras, but, with this exception, the progress, judged merely from the returns showing the work completed during the year, could hardly be termed quite satisfactory. A study, however, of the annual reports of the provinces in which the bulk of forest settlement work has not already been completed shows that settlement operations, embracing a very considerable aggregate area, are in active progress. Nevertheless, considering the large areas regarding which the legal status has not been finally determined, it would be advisable that special efforts should be made to remove as soon as possible the uncertainty in respect of possession and rights, which cannot but be a disturbing element in sound and systematic forest administration.

Bengal.—Apart from forests already declared reserved under section 34 of the Forest Act (*vide* paragraph 6 of the Review for 1889-90), and of which the re-settlement was proceeded with during the year under Chapter II of that Act, 183 square miles of forest, proposed for constitution as reserves, were under settlement or had remained to be finally notified at the close of the year. The question of the extent to which other and more extensive areas under the control of Government can be subjected to a legal settlement of private rights and converted into reserved forests, and of extending State control over certain other forests, engaged the attention of His Honour the Lieutenant-Governor and the Forest Department under his control during the year.

North-Western Provinces and Oudh.—In the Central Circle the settlement of reserves was proceeded with in the Jhansi, Lalitpur and Banda districts, while in the Dehra Dún a few blocks of forest were either under settlement or proposed for reservation.

Punjab.—Final orders were not passed during the year regarding the forest settlement in Kangra proper and in Kulu, the continued delay in the disposal of which questions was alluded to in the Review for 1889-90. The attention of the Local Government was again prominently directed by the Government of India to this subject after the close of the year. An enquiry into and record of privileges in the leased forest of Pangi, in the Chamba State, which had been commenced in 1886, was completed during the year. An area of 15,614 acres, made over to the Military Department, was constituted Reserved forest under Chapter II of the Forest Act. The proposals made in previous years for the constitution of large Reserved forest on the Chenab canal were abandoned. Another proposal, however, to form an irrigable plantation of 20,000 acres in proximity to the canal was under consideration. No expenditure on forest settlements was incurred by the Forest Department.

Central Provinces.—No important changes took place in the constitution of the forests of which the unclassed areas form an insignificant proportion. The Government of India, when reviewing the Administration Report for the year, remarked that the reserves comprise at present 23 per cent. of the total area of the province, a large porportion of which is *primâ facie* forest-land. Nevertheless it was recommended that the question should be considered whether and to what extent the retention of so much forest, the entire produce of which cannot be consumed by the existing population, offers a restricting influence to the extension of permanent agriculture.

Lower Burma.—Owing to scarcity of officers the progress made in the constitution of reserves was slight. It is, therefore, satisfactory that 369 square miles were under settlement, and that the reservation of further areas was under consideration. It is true that a final forest settlement is not so immediately necessary in Burma as in a country where a dense agricultural population makes constantly increasing demands on the resources of the forest; but reservation is probably urgently required in some localities, more especially in order to protect the important industry of cutch-boiling.

Upper Burma.—Considerable progress was made during the year in the examination of the forests with a view to reservation, and the area which had been thus studied since annexation up to the close of the year amounted to 16,000 square miles. The systematic examination of the forest resources has confirmed previous anticipation as to the wasteful manner in which, previously to the conquest of the province, the teak forests had been worked. During the

year 35 square miles of forest were declared reserved in the Ruby Mines Districts, while a further area of 1,394 square miles were under settlement, and the preliminary steps were taken for the reservation of 1,800 square miles. Investigations in respect of the extent and condition of the cutch forests were actively proceeded with during the year, and measures for the conservation of this valuable product were under consideration.

Assam.—The progress effected was as follows: An area of 129 square miles, including, it is understood, 20 square miles of forest already protected, was declared reserved during the year. Proposals for the further reservation of 486 square miles of forest were under consideration at the close of the year, and 7 square miles, which have since been gazetted as reserves, were under settlement.

Coorg.—The area of Reserved forests was augmented by 6·74 square miles during the year under review, and the first steps were taken towards a forest settlement of the Ghât forests, comprising 303·84 square miles. Notifications under the Forest Act, preliminary to reservation, were also issued in respect of certain small fuel and sandalwood plantations. No progress was made in actual forest settlement work, owing to the difficulty experienced in procuring a special officer for this purpose.

Ajmere.—As noted previously under 'area,' the progress made in the constitution of the forest was unimportant.

Andamans.—With reference to the remarks contained in the Review for 1889-90, it is unsatisfactory to have to record that no commencement was made during the year in the systematic examination of the padouk forests; but, as the available establishment has been increased, there is reason to hope that this work, so essential to the economic utilization of the forests, will be no longer delayed.

Baluchistan.—As mentioned above, considerable progress was made during the year in the constitution of the State forest property, while further extensions, principally in the Zarghun and Thalli tracts were under consideration.

Berar.—During the year a new State reserve of 6,250 acres was formed in the Akola district, and 41,570 acres was added to the area of the Kinwat reserve. The determination as to what forests were to be permanently retained was rapidly proceeded with. The completion of the classification of the forests at an early date was, after the close of the year, stated by the Government of India to be desirable, in order that grants of waste land for cultivation might be made. Such grants were withheld during the year pending the classification of the forests. Rules under the Berar Forest Law for regulating the conservancy of the various classes into which the forests are to be grouped, were prepared and submitted to the Supreme Government after the close of the year.

Madras.—The area notified as Reserved forests during the year amounted for both circles to 1,374 square miles, a figure which largely exceeds that of any previous year. The selection of additional areas, amounting in round numbers to 5,000 square miles, was under consideration. The progress made in the actual work of forest settlement was, however, inconsiderable. No less than 6,467 square miles of forests, although settled, were not declared reserves during the year. One thousand square miles of forests were notified as proposed reserves under section 4 of the Madras Forest Act.

Bombay.—The returns regarding Forest Settlements completed during the year do not exhibit a satisfactory advance, but from the Conservators' reports it is evident that settlement operations are in active progress over areas aggregating some 1,100 square miles. The following areas require still to be settled before the forest administration of the province is placed throughout on a safe legal footing, *viz.*,—(*a*) Reserves declared under section 34, 1,785 square miles; (*b*) Protected forests, 4,328 square miles; the whole aggregating 6,113 square miles. In addition it will be found necessary to supplement largely the area of the Sind forests, owing to the fact that the area of productive reserves has been largely reduced by the damming out of the floods of the Indus, and to the constantly increasing demands for fuel made on these forests.

III.—Demarcation.

5. The progress reported regarding the demarcation of State forests and the maintenance and improvement of existing boundary lines may be regarded as satisfactory.

The closer and more accurate definition on the ground of the original demarcation has in some instances resulted in most inconvenient boundaries, owing to an insufficient record having been kept of the traditional bound-

ary line which followed the natural configuration of the ground between the boundary pillars, which were frequently separated by a distance of a mile or two. In such cases it was evidently intended that the boundary should follow the natural features of the ground, but the early maps only show a straight line from pillar to pillar, which must therefore be followed, sometimes at great inconvenience, by a more detailed demarcation. Wherever exchanges can be effected, the natural boundary should as much as possible be restored, even at a loss of area, and the inconvenience now experienced, which demonstrates the necessity of an accurately written boundary record in addition to the preliminary demarcation, should serve as a warning example for the future.

Bengal.—All the reserved forests having been previously demarcated, work in this connection was of the nature of maintenance, on which R5,008 were expended, principally in Chittagong, Singhbhoom, and Jalpaiguri, as against a total expenditure of R5,465 in 1889-90. Considerable popular discontent was occasioned by the policy pursued in respect of the alignment of forest boundaries in Angul and Khurda. After the close of the year this subject was adverted to by the Government of India, and orders for its consideration were issued by the Local Government.

North-Western Provinces and Oudh.—Considerable attention was paid during the year to the settlement of forest boundaries and their permanent demarcation, and the importance of securing an adjustment of any doubtful points which may still exist, particularly in the Oudh Circle, was fully recognised by His Honour the Lieutenant-Governor. The total expenditure in all three Circles was R8,584, or R2,478 in excess of that incurred in the previous year. More than half the expenditure took place in the Central Circle, where R2,220 were disbursed on the boundary of the Lansdowne reserve. It was reported that, in the School Circle, the delimitation of the forests remains in a very backward condition. The Nepal Durbar again neglected to clear their side of the provincial boundary line in the Oudh Circle.

Punjab.—The boundary work carried out was somewhat less than in 1889-90. A fairly satisfactory amount of work was done in the six hill divisions, where 370 miles of boundary lines were cleared or maintained, and 5,776 pillars erected or repaired. It is satisfactory to observe that the demarcation of the insufficiently defined areas in the plains divisions received attention. R4,542 were expended on demarcation, as against R5,626 in the previous year.

Central Provinces.—Demarcation of the forests was reported to be almost finished in six out of the nine divisions of the Southern Circle, but much was still required in Chanda. In the Northern Circle, a large quantity of new work was effected in Mandla, and elsewhere the state of the boundaries appears to have received generally sufficient attention. After the close of the year the Chief Commissioner issued orders for the more speedy prosecution of delimitation. The total expenditure incurred was R9,902, of which R6,459 was on account of forests in the Southern Circle.

Burma.—In Lower Burma the boundaries of existing reserves were reported to be in good order, and no encroachments on the area of the State forest property seem to have taken place. The reports from both circles show that the boundaries were inspected and the boundary-marks repaired where necessary. The total expenditure under this head was R3,520. In Upper Burma a commencement was made in the demarcation of the Ruby Mines reserves which were constituted towards the close of the year, and 55½ miles of boundary lines of proposed reserves in the Pyinmana Division were marked by blazing trees. R6,254 in all were expended.

Assam.—The existing demarcation of the forests was maintained, and a small amount of new work was undertaken The total cost was R486 less than in the preceding year, and the expenditure incurred per mile of demarcated boundary was reduced by 4½ annas. The average cost per mile, *viz.*, R3-9-11, appears to be high; but the Report does not distinguish between expenditure incurred on new work and on repairs. The total expenditure was R3,857.

Coorg.—The demarcation of the State reserves received attention and their delimitation was nearly completed. Though the boundaries of the Ghât forests cannot, until the forest settlement has been completed, be specifically defined in every instance, considerable progress was made in their selection. R1,030 was expended on new work and R1,261 upon maintenance.

Ajmere.—A sum of R605 was spent on clearing boundary lines, 30 feet wide, around the State reserves. These lines also serve the purpose of fire-traces, and the practice appears to be a commendable one. Boundary-marks round most of the forests were repaired during the year at a cost of R76.

Andamans.—No boundary work was undertaken, as the forests in the island have not been demarcated.

Baluchistan.—The Gwal forest, to which alone the opinion of the Government of India as noticed in the Review for 1889-90 applied, was demarcated during the year. The forests taken up during the year were, with two exceptions, demarcated, and repairs were made where required. The expenditure incurred was R311.

Berar.—A sum of R1,533 was expended under this head. Attention was given to the execution of new boundary work and to repairs, but the remarks recorded in the Review for 1889-90 require qualification, for the provincial administration report shows that some of the State forests remained undemarcated at the close of 1889-90 Demarcation work was in many places postponed during the year pending the constitution of the forests under the Berar Forest Law, but was to be re-commenced immediately. The Government of India after the close of the year stated that the demarcation of the State forests should no longer be delayed.

Madras.—In the Northern and Southern Circles 812 and 1,531 miles of boundary respectively were permanently demarcated. The cost rates amounted to R9-9-0 and R12-6-7 per mile. In addition a considerable amount of preliminary demarcation and maintenance was done in the Northern Circle. R20,242 and R18,889 were spent under this head in the Southern and Northern Circles respectively; but, with reference to the remarks recorded in the last Review, the information in the report for the year on this subject continued to be wanting in uniformity and clearness of detail, rendering it difficult to compare the results achieved from year to year. In reviewing progress made, the Government of India expressed the hope that the work done and cost incurred on account of demarcation might be more clearly reported on in future years.

Bombay.—Considerable progress continued to be made in laying down the permanent boundary lines of Government forest estates. Owing, however, it would seem, to insufficient demarcation at the time the estates were first formed, and to the fact that an insufficient record has been kept of the natural and traditional boundaries between the original pillars, which are reported to be sometimes a mile or two apart, it is frequently found that the detailed demarcation, following of necessity the straight line between such pillars, gives a most inconvenient and unnatural boundary. It is desirable that this should be rectified by exchanges of land as far as possible.

IV.—Surveys.

6. The following table shows that the forest area surveyed during the year amounted to 3,223 square miles, and exceeded that of the previous year by 548 square miles. This is satisfactory; but, in consideration of the fact that, with few exceptions, the systematic working of our forests must be primarily based on area—a system which naturally requires reliable maps—a large amount of work lies still before us. Up to the end of 1890-91, surveys have been completed of about 14,000 square miles of State forests, so that even if the progress be raised to 4,000 square miles per annum, some 25 years must elapse before sufficiently accurate maps for all forest areas have been prepared. Until then the assistance now given by the Survey of India Department should be maintained at least at the present scale.

Presidency or Provinces.	Surveyed with topographical detail on the following scales.																Total Topographical Surveys.		Survey of Boundaries only.	
	1" = 1 mile.				4" = 1 mile.				8" = 1 mile.				16" = 1 mile.							
	1890-91.		1889-90.		1890-91.		1889-90.		1890-91.		1889-90.		1890-91.		1889-90.					
	Area surveyed.	Cost rate per square mile.	Area surveyed.	Cost rate per square mile.	Area surveyed.	Cost rate per square mile.	Area surveyed.	Cost rate per square mile.	Area surveyed.	Cost rate per square mile.	Area surveyed.	Cost rate per square mile.	Area surveyed.	Cost rate per square mile.	Area surveyed.	Cost rate per square mile.	1890-91.	1889-90.	1890-91.	1889-90.
	Sq. ms.	R	Sq. ms.	R	Sq. ms.	R	Sq. ms.	R	Sq. ms.	R	Sq. ms.	R	Sq. ms.	R	Sq. ms.	R	Sq. ms.	Sq. ms.	Sq. ms.	Sq. ms.
Bengal	...	.	...	.	174	(a) 136	...	...	...	...	...	...	...	...	...	...	174	...	...	...
North-Western Provinces and Oudh	...	..	...		35	(a) 87	341	30	...	...	46	(a) 53	...	...	...	...	35	387	19	60
Punjab	453	12	302	14	158	63	198	65	...	...	...	...	...	...	...	...	611	500	45	...
Central Provinces	...	...	...	..	461 483	(a) 170 (b) 48	405 418	(a) 172 (b) 50	...	...	...	...	108	(b) 48	70	(b) 50	1,052	893	1,586	1,079
Burma (Lower)	...	...	...	...	167	(a) 178	169	(a) 354	...	...	...	...	...	...	...	...	371	169	...	...
Assam	...	..	...	..	180	44	...	...	...	...	...	...	...	...	...	...	180	...	101	...
Madras	...	..	...		465	(a) 112	314	(a) 140	...	...	...	...	...	...	...	...	465	314	266	...
Bombay	...	...	...	..	124	(a) 112	158	(a) 84	393	(a) 140	335	(a) 145	22	(a) 193	19	(a) 185	539	512	...	...
Total (c)	453	...	302	..	2,347	...	1,903	...	393	...	381	...	130	...	89	...	3,223	2,675	2,017	1,139

(a) Of Survey of India Department other rates are those of Forest Survey Branch.
(b) Average cost of both 4-inch and 16-inch scales, including boundary surveys.
(c) In addition, various surveys were carried out in the several Provinces by local agency, but their inclusion in the above statement has not been found possible owing to the details reported being in most cases insufficient.

7. Owing to the fact that the survey year ends on the 30th September, and that the forest year has hitherto closed on the 31st March, or six months previously, the information recorded in the Forest Reports on the subject of surveys in the returns for 1890-91 and previously has often been misleading or inaccurate. Thus, many of the Forest Reports for 1890-91 contain, as indicating survey-progress during that year, extracts from Survey Reports for the preceding year. In the notes which follow, the facts and figures refer to the survey year ending 30th September 1891, and this course will be followed in future, as it is impossible to record and review otherwise the work done. As the forest year, commencing from 1892-93, is to close on the 30th June, a date by which most survey operations, in the plains at least, will have ended for the season, it is hoped that Conservators and Local Governments will be able to obtain from the Survey of India Department or from the Forest Survey Branch approximately correct figures showing progress up to the latest known date. In any case, the survey work recorded in a forest report for any particular year should agree with that entered in the Survey Reports for the same year.

As the figures showing progress of forest surveys during 1889-90, entered in the last Review, were, for the reasons indicated, incorrect, the above statement shows the areas surveyed in the different provinces by parties of the Survey of India and the Forest Survey Branch for the year under review and for 1889-90.

Bengal.—A party of the Survey of India Department continued its operations in the Jalpaiguri District. Sickness and difficulty in supplying labour retarded the survey of the Buxa forests. No further progress was made by the Imperial Forest Survey Branch in Singhbhoom, owing to the unsettled state of the boundaries between the Saranda reserve and the State of Keonjhur.

North-Western Provinces and Oudh.—The work done under this head during the year was unimportant, but it should be remembered that the surveys of the Government forests in this province are more advanced than in any other part of India. In the Central Circle certain minor surveys were undertaken departmentally, and the Lansdowne reserve was mapped by the Imperial Survey Department. In the other Circles, the surveys made were insignificant.

Punjab.—Surveys of the forests in the Kangra District were continued during the year by a party of the Imperial Survey Department, and considerable progress was made. The Forest Survey Branch was employed in the leased forests of Bashahr, and completed 472 square miles of triangulation and 611 square miles of topographical surveys. Arrangements were made in conjunction with the Land Revenue Survey, in progress in certain districts, for the survey of the Bhera forests in Shahpur.

Central Provinces.—The Forest Survey Branch was employed in the Bhandara, Jubbulpore, and Raipur Districts, where 596 square miles were surveyed, while 531 miles of linear boundary surveys were effected. The area triangulated amounted to 615 square miles, all in the Bhandara District. In the Northern Circle, a party of the Survey of India was employed in the Betul and Hoshungabad Districts and completed 471 square miles of survey. The area triangulated was 497 square miles, and 754 linear miles of traverses and boundary surveys were completed. The forest and soils on all areas topographically surveyed were classified and recorded on separate traces for the Forest Department.

Burma.—In Lower Burma the Imperial Survey Department completed during the year 167 square miles of detailed survey on the 4-inch scale and 200 square miles on the 2-inch scale. In addition they executed a traverse survey of about 204 square miles and some advance triangulation. The cost of the work was estimated at R97,000, which compares favourably with the results of the previous year. The work in the forests was less frequently interrupted by sickness than in the previous season, though again some of the best men died from the effects of malaria, and others were invalided. The Forest Survey Branch opened work to the Tenasserim Circle during the year. An area of 209 square miles was triangulated, and theodolite and chain traverses were made over 185 square miles. The cost rates, considering the fact that initial difficulties had to be overcome, were satisfactorily low.

In Upper Burma very commendable activity was displayed by the staff of the Forest Department in local topographical surveys and in traverses with the chain and plane-table or compass. The surveys already executed in this manner comprised at the close of the year under review no less than 38,427 acres.

Assam.—The survey of the sâl forests of the Goalpara District was resumed during the year by the Imperial Forest Survey Branch. The area topographically surveyed was 180 square miles, and a record of the distribution of the forests and the quality of the soil was at the same time prepared. Triangulation extended over 1,106 square miles, and 61 square miles were traversed. The total expenditure incurred was R21,186.

Coorg.—A professional survey by the Madras Revenue Survey Department of the Ghât forests was commenced during the year. About 60 square miles of area were surveyed at a cost of R2,438, or R42 per square mile. These figures are not included in the statement given above.

Ajmere.—No forest surveys of any description were in progress or commenced.

Baluchistan.—Some minor departmental surveys, including the mapping of a portion of the Gwal forest, were carried out.

Andamans.—Nothing was done in this direction, and it was reported that existing maps would be sufficient for forest purposes.

Berar.—The Forest Administration Report for the year indicates what was done in this direction during the survey year 1889-90 and need not consequently be here noticed. No actual survey operations appear to have been in progress.

Madras.—The party of the Survey of India Department was employed, as in the previous years, in the Southern Circle, and is extending by degrees its operations northwards. A satisfactory outturn of work was accomplished. Of topographical surveys on the 4-inch scale, 465 square miles were completed, together with 1,050 square miles of traversing, and 274 miles of linear surveys. The cost rate of topographical work was reduced from R149 to R112. The latter rate is still in excess of that incurred on forest surveys in the Bengal Presidency, but measures have been devised, by concentrating operations in adjoining districts, which, it is anticipated, will reduce the cost to its normal figure. During the year the Madras Revenue Survey Department was engaged, in connection with its own work, in the survey of certain forest tracts in Bellary and Adoni. In both Circles various Departmental surveys for settlement purposes were carried out at a cost of R15,031.

Bombay.—The forest surveys in Bombay are mainly executed on the 8-inch scale. The average cost of the survey at this scale was reduced from R145 to R140 per square mile, whereas the cost of the 4-inch scale increased from R84 to R112 per square mile. The surveys made of the Sind forests, executed by local surveyors, seem of doubtful value, and have not as reported, owing to the ignorance of Divisional Officers, ended in any systematic check.

V.—Working-Plans.

8. The progress made in the provinces under the Government of India is exhibited in the following table:—

Province.	Preliminary proposals submitted for Working-Plans		Plans submitted for opinion and remarks of Inspector General of Forests		Plans finally sanctioned by Local Governments on recommendations of Inspector General of Forests	
	Number.	Area for which prepared.	Number	Area for which prepared.	Number	Area for which prepared
Bengal	1	38 square miles	...	...	...	...
North-Western Provinces and Oudh	...	...	1	113 square miles	..	...
Punjab	...	..	1	170 " "	1*	170 square miles.
Burma	...	...	2	296 " "	1	129 " "
Assam	..	..	1	4 " "	1	4 " "
Berar	1	550 square miles	...	...	...	...
Total	2	588 square miles	5	583 square miles	3	303 square miles.

* In addition, a revision of the Working-Plan of 1886 for the Changa-Manga reserve (32 square miles in area) was sanctioned by the Punjab Government during the year.

The above figures indicate a great improvement as compared with the previous year, but the following statement shows the very disappointing fact that, up to the end of 1891, only 2,396 square miles had been brought under systematic working, or 2·98 per cent. of the area under the control of the Department, and 5·70 per cent. of the area of reserved forests:—

Province	Forest Area in square miles				Area for which Working-Plans prepared up to 31st March	Proportion of Forest area under Working-Plans.
	Reserved.	Protected	Unclassed State.	Total.		
					Sq. miles	Per cent.
Bengal	5,189	2,209	4,034	11,432	2	0·02
North-Western Provinces and Oudh	3,602	94	132	3,828	777	20·30
Punjab	1,694	354	3,916	5,964	322	5 40
Central Provinces	19,680	...	393	20,073	...	...
Burma (Lower)	5,603	...		5,603	1,201	21·43
Burma (Upper)	35	16,014	35	16,084	...	...
Assam	3,602	916	5,470	9,988	11	0·11
Coorg	247	609	...	856	83	9 69
Ajmere	140	...	8	148	...	...
Baluchistan	78	...	...	78	...	...
Andamans	...	...	1,957	1,957	...	...
Berar	2,149	...	2,136	4,285	...	...
Total	42,019	20,196	18,081	80,296	2,396	2·98

9. The reason of this unsatisfactory progress can only be looked for in the elaboration—in many instances over-elaboration—of the first plans introduced into India, and the disinclination on the part of many of the working-plans

officers to leave the track marked out by some of their predecessors and to submit less pretentious, though equally useful, plans.

It is under present circumstances undesirable that the more or less stereotyped pattern of working-plan of continental Europe, especially that of Germany, which has developed to a great extent simultaneously with a system of equi-aged crops, should be grafted on our Indian Forest Administration, as we have in this country almost invariably to deal with forests in which the age-classes are intermixed, and which, consequently, require a more natural and less constrained treatment.

No doubt a very large proportion of our Indian forests are in the same condition, and frequently in a worse state than that which, in the latter half of the last century, led on the Continent, principally in Germany, to the more or less general adoption of the treatment under equi-aged crops. The former have been in most instances ruined by centuries of mismanagement and are even now subjected to extensive—frequently excessive—grazing; and this makes it doubtless necessary that the reproduction and young growth should, as far as practicable, be concentrated within defined areas in order to render their protection and proper treatment feasible.

To a great extent, however, this purpose can be arrived at by a mere localization of the exploitation of the forest and by a rotation of fellings, and, consequently, by a treatment based purely on area and the sylvicultural requirements of each component part of the forests. In the great majority of the Indian forests, especially in regard to those which have been subjected to fires, over-grazing or periodical cultivation, the most suitable sylvicultural treatment consists without doubt in improvement fellings, more or less severe as demanded by the local conditions of climate, position, soil, and the character of the existing forest. It goes without saying that the areas thus treated must be closed strictly against grazing for a period sufficiently long to admit of the young growth outgrowing all possibility of damage from this cause, and it is this consideration which to a great extent must affect the length of the period of the return of the fellings to the same locality. The greater the area of a forest which can be entirely closed to grazing and which can be successfully fire-protected, the more rapid may be this return, and within certain limits, dictated by the opening out of the canopy, necessary for the exposure of soil and the admission of light required to ensure reproduction and to favour young growth, the more rational can be the treatment. In consideration of the above statement, and in view of the slow progress noticed as regards the preparation of working-plans, the following quotation from last year's review will not be out of place:—

"In the great majority of cases in India working schemes of the simplest nature are all that is necessary in order that the forests may be permanently exploited with order and reasoned method. In such instances the laborious collection of statistics and the application of elaborated methods of treatment are not required, and would often defeat their aim or hinder the workman-like conduct of forest exploitation. The preparation of such simple working-plans is, therefore, within the time and competence of the average Forest Officer if the work be conducted systematically."

10. The following extracts show the progress made in each province:—

Bengal.—In this Circle the special agency for the preparation of working-plans has recently been abolished. The number of qualified officers available for such work is very limited, but special effort is being made to organize the working of the most valuable areas. A systematic examination of the Darjeeling forests, in view to the preparation of a working-plan, was made during the year, and work in connection with the plan itself was commenced. Reports on the Kurseong, Singhbhoom, and Sundarbans reserves, preliminary to the preparation

of regular working-plans, were drawn up during the year. No additional areas were actually brought under the provisions of plans, but the subject received special attention, and there is promise of a number of plans for the more important forests being speedily prepared and brought into operation.

North-Western Provinces and Oudh.—Several of the existing working-plans in force are unsatisfactory. Their prescriptions are involved and unnecessarily complex, rendering the plans most difficult to apply and to control. Many of these plans in the Central and School Circles urgently need revision, while there has been great delay in the completion of plans for important forests in Oudh. In the Central Circle the plan of the Palain-Kotri forest, alluded to in the Review for 1889-90, was sanctioned during the year. In Kumaun a commencement was made in the collection of data for a working-plan, but the work was unavoidably postponed. In the sâl and khair areas, however, sufficient information for the preparation of plans was obtained, but much remains to be done in this Circle. In Oudh a plan for the Gorakhpur forest, which was not however prepared upon correct principles, was submitted for sanction. The plan for the Kheri forests still remained uncompleted. In the School Circle no new plans were under preparation. After the close of the year the attention of the Local Government was drawn by the Inspector-General of Forests to very serious deviations which had taken place from the prescriptions of working plans applied to forests in the province. The Local Government, in remarking upon those deviations, drew attention to the object of working-plans and to the necessity of strictly observing their provisions, unless in exceptional cases where non-observance was unavoidable and proper sanction to the deviations duly obtained.

Punjab.—One of the causes tending to retard the preparation of important plans for the forest of this Circle is the continued delay in the issue of orders on the settlement of several extensive forest tracts. It is manifestly useless to draw up schemes for working the forests, until the legal position of such areas has been definitely secured. The Working-Plans Branch, which was revived at the close of the year 1889-90, was employed mainly in the Bashahr State. The necessity for the preparation of working-plans for certain forests in the Kangra District, adverted to in the Review for 1889-90, does not appear to have received any special consideration. During the year working-plans for the Changa-Manga and Murree forests were finally approved; and, after its close, another for the Pangi forests was forwarded for sanction. Plans which had been prepared more than twelve months previously for the Kotguru-Kotkhai forests, as well as for those belonging to or leased by the Simla Municipality, still remained at the close of the year under consideration. The provisions of the plans in force were, for the most part, carried out, but sufficient attention was not given to the general control of working in accordance with the prescriptions of the Forest Code. The sanction of the Local Government to the important deviations from certain plans which took place was not obtained during the year.

Central Provinces.—It is satisfactory to observe that at last efforts are being made to make a commencement in the preparation of plans which need in most cases be of the simplest nature, exploitations being based on area and on cultural rules only. Organized working under the provisions of regular plans is a question of pressing importance in these provinces. In the Southern Circle the subject received attention, and some enumerations of stock and preliminary reports were prepared. Of 9,973 square miles of forest in this Circle, and controlled by the Forest Department, 120 square miles were taken in hand during the year. In the Northern Circle a special officer was employed during a portion of the year, but his services were unavoidably withdrawn. The Conservator reported that his officers had no time to devote to drawing up plans. In neither Circle was any plan completed or sanctioned during the year. The Government of India, in reviewing forest progress, remarked that the advance made in the compilation of these plans was disappointing, and that the slow progress is attributable to the system of selling forest-produce on licenses, and to the desire of framing more elaborate plans than are necessary. The proposal made by the Conservator of the Northern Circle for the gradual abolition of the license-system and the substitution of localized fellings in its stead was accordingly approved of by the Supreme Government.

Burma.—Excellent work in this direction has been and is being effected in both Upper and Lower Burma. The preliminary work has mainly consisted of linear valuation and ordinary topographical surveys of the forest. In Lower Burma the working-plan for the Taungnyo forest, referred to in the last Review, was completed, and progress was made in the preparation of plans for the Shwebo and Nawin forests in the Prome Division. Annual plans of operation were prepared and well worked up to. Considerable progress has been made in the Pegu Circle, which in this respect is far in advance of the Tenasserim Circle. Regular working-plans are indispensable in Burma, where their object must be the maintenance and amelioration of a mixed forest, consideration being had to the few valuable species which are systematically extracted.

This is the most difficult problem of Indian forestry, especially as the questions to be solved vary with the conditions of position, soil, and climate. By constant study alone can the forest administration expect to control the working of these mixed forests, embracing, as it must, the exploitation of teak only, or sometimes of one or a few other valuable species in addition, in such a manner as to maintain the capital value of the property. In Upper Burma rough working-plans were under preparation during the year in the Taungdwingyi Kyaw and Yaw forests. The progress made in linear valuation surveys of the forests was specially satisfactory, countings having extended over no less than 20,446 acres, as against 6,639 acres in 1889-90, and 11,342 in the preceding year. In his review of progress, the Chief Commissioner intimated his sense of the importance of preparing working-plans, and directed that such operations should be rapidly pushed on.

Assam.—Work was confined to the sâl-producing forests of the Goalpara District. The Officer in charge was engaged in the demarcation and classification of various kinds of forests and in the opening out of compartment lines. Progress made was satisfactory, 422 square miles having been examined; but no enumeration of stock took place owing to delay in the completion of survey operations. It is satisfactory to record that the cost per square mile of forest incurred on delimitating the compartments was very considerably reduced as compared with the results of the previous year.

Coorg.—With reference to the remarks contained in the Review for 1889-90, a beginning was made towards the introduction of systematic management by the compilation of a working-plan for the North Dubari forest, and plans for the South Dubari, Devamachi, and Mawukal forests were under preparation during the year. The general annual plan of operations was fairly well adhered to.

Ajmere.—It is satisfactory to learn, from a perusal of the Administration Report, that the necessary information and statistics for the preparation of a working-plan for the forests were collected during the year. The plan was to have been framed during the rainy season.

Baluchistan.—No working-plans were prepared during the year.

Andamans.—Nothing in this direction was attempted; but it was stated that work was to be commenced in accordance with the suggestions contained in the report by the Inspector General on these forests.

Berar.—Although no working-plans were definitely prepared and sanctioned during the year, the subject received considerable attention, and draft plans were made and necessary data collected for a number of forests. The work carried out in this direction was creditable to the officers concerned, and will, it is hoped, be actively proceeded with in future, in accordance with suggestions previously made by the Government of India. The greater portion of the more valuable forests in Berar need not be worked under plans other than those of a simple kind, easy to prepare and to apply.

Madras.—Progress in the direction of a systematic working of the forests, based on regular working-plans, remains in a backward condition, and in this respect the province compares unfavourably with those in the Bengal Presidency. One plan in the Southern Circle was sanctioned during the year, and a few others were under preparation or revision. In the Northern Circle the provisions of the few working-plans, already prepared, were not adhered to, and matters were practically at a stand-still. It was reported that no progress could be made during the next two years. The backward condition of the organisation of the forests is a matter for regret, but both in respect of the establishment available for the preparation of working-plans, and in regard to the settlement, demarcation, and survey of the forests, the administration of the local Forest Department is in a state of transition. The fact that the provisions of several existing plans were departed from, indicated, in the opinion of the Government of India, as expressed in their review of progress for the year, that either the schemes were unsuitable, or that deviations from their prescriptions are not sufficiently guarded against. The procedure for the control of working-plans in the Madras Presidency is not, it was said, so strict as that in the provinces directly subordinate to the Government of India.

Bombay.—Great activity has been displayed in this presidency in bringing the forest areas under systematic working. It is difficult, however, to ascertain from the tables submitted in the Progress Report the areas over which working-plans have reached completion—a stage which cannot be said to have been obtained until the whole of the component compartments have been laid out on the ground.

The working-plans of the Sind and Northern Circles are based entirely on area: whether this is also the case in the Southern Circle cannot be ascertained from the meagre report submitted on the subject. In the Sind Circle report the system of management is not explained, but would seem to consist of clear fellings and natural reproduction, both by coppice and seed, under the direct influence of inundation.

In the Northern Circle the preparation of working-plans seems to have been as yet mainly confined to the Thana District, and the system which has been adopted under the force of circumstances has been described as "coppice under standards," though, to judge from the very concise and useful sylvicultural rules, the system seems to partake considerably of the character of very severe improvement fellings, permitting during future rotations, if necessary, of an easy transformation into a system of *bonâ fide* jardinage. In consideration of the great suitability of the Thana climate for forest growth, the permanent maintenance of the present sylvicultural system seems to involve no danger of a deterioration of the soil, nor do the reports indicate that the energetic opening out of the canopy has led to an overgrowth of the areas by weeds and grass, thus preventing the establishment of seedlings—a fact which would certainly have been noted if the danger existed.

11. This review of the progress made in the preparation of working-plans cannot be more fittingly closed than by noting, in grateful remembrance, the services rendered in this branch of forest administration by the late Mr. D'Arcy, both as Assistant Inspector-General of Forests in the ordinary course of his work and by the publication of his valuable little book "Notes on the Preparation of Working-Plans."

VI.—Communications and Buildings.

12. No improvement has taken place in the progress made in the construction of forest roads. It is certainly not the duty of local forest administrations to construct export roads far beyond the limits of their charges, but there is no doubt that a considerable portion of the State forest property could be rendered more valuable, both as regards revenue and general utility, by a system of internal lines of communication connected with existing public roads, or worked out in connection with district roads which may be projected, or the construction of which may be under contemplation. It is of great importance that all amelioration in this respect should be proceeded with on a preconsidered plan. Conservators might see that each Divisional Officer is in possession of a map showing existing and probable markets for his forest produce, as well as all roads which may possibly be utilized for the transport of such produce. It would also be advisable that, following the example of the Bombay Government, the Forest Department should be consulted as regards any public road-project in the vicinity of forest areas under its charge, and that it should even propose such projects.

The cost of carriage of forest produce represents, in most instances, the major portion of its price, and a far greater benefit is conferred on consumers by facilitating the cost of transport than by reducing original prices, or by granting privileges in regard to extraction.

Bengal.—But little was done in the direction of extending communications. Six miles of roads and 40 miles of inspection paths were prepared at a cost of R1,186, while on repairs to existing roads R4,881 were expended. The Conservator stated that the subject of communications had been much neglected, and the Government of India, in reviewing his report, suggested that the advisability of preparing a general project for the extension of forest roads during a series of years should be considered; for the result of a want of system must be that some of the roads will be found impracticable for traffic and the expenditure upon them wasted. R8,539 were spent on repairs to existing constructions, while R6,851 was incurred on new work.

North-Western Provinces and Oudh.—The attention paid to the subject of roads and buildings in these provinces continued to be satisfactory. In all R87,823 was expended under this head, as against R98,091 in the previous year. The reduction took place in all the Circles. The sum expended on new roads was R9,804. R36,845 was spent upon buildings, and R3,382 on other works. The average percentage of expenditure incurred under this head on the gross charges of the year amounted to 9·56. In the Central Circle the percentage is high, standing at 17·99, but was reduced on the figure of the previous year by 2·18.

Punjab.—The operations carried out were, as in previous years, comparatively unimportant. Expenditure was incurred chiefly in the Chamba Division. In all, R7,919 was spent on communications, R6,312 on buildings, and R84 on other works. The total expenditure amounted only to 1·72 per cent. on the gross revenue, the corresponding percentage for the whole of India being 1·93.

Central Provinces.—The total expenditure under this head for both Circles was R11,182, of which R7,239 was incurred in the Northern Circle, The cost of communications, *viz.*, R2,846, still continued to be inconsiderable. On buildings, R7,755 were expended, principally in the Northern Circle. The balance of the total expenditure was on account of "other works."

Burma.—In Lower Burma the total expenditure incurred was R17,295, of which only R205 was for the development of communications, and R13,352 for buildings. The progress made in opening out the forests by the construction of lines of communication cannot be considered satisfactory. It is no doubt true that the bulk of the forest-produce is exported by natural water-ways, and that the want of roads is not at present much felt. It is certain, however, that there are forests which would be beneficially influenced by the construction of cart-roads, enabling produce to be brought nearer to the markets. It would seem advisable, too, that greater attention should be paid to river communication. During the year nothing was done in this direction in Tenasserim, and even in the Pegu Circle only R2,232 were spent. The reports show besides that obstructions which were complained of many years ago still exist in the lower reaches of certain streams. In reviewing the work of the year, the Government of India expressed a hope that greater attention would be given to those river and road communications which keep the forests in touch with the sources of demand. In Upper Burma R10,647 were expended under this head, mostly on the erection of or repairs to quarters for the forest establishment, which works cost R9,594. Nothing was spent on lines of forest communication or export.

Assam.—Sufficient attention would seem to have been given to this subject. R3,486 were spent on communications, but the cost and quantity of new work was not reported. Most of the expenditure was incurred on account of maintenance. R8,052 were expended on buildings, principally on repairs and improvements.

Coorg.—A sum of R1,643 was spent under this head, principally upon petty repairs to roads and buildings. No new work was undertaken. It is to be regretted that no progress was made during the year in the opening out of the forests by new roads, but the importance of improving means of communication and of connecting, by serviceable cart-roads, the forests with the markets is understood and meets with attention.

Ajmere.—R499 were expended on the repairs of 19 miles of inspection paths. Other work was insignificant. The total expenditure amounted to R788.

Baluchistan.—Only R676 were expended on works of this kind, which were too minor to merit notice in this Review.

Andamans.—The total amount debited to this head during the year was R17,359. No expenditure on buildings took place. The tramway for the extraction of timber, alluded to in the Review for 1889-90, was purchased and laid during the year for a length of 1½ miles, at a cost of R14,725. A further extension by 1 mile, at a cost of R8,100, was sanctioned after the close of the year. The advantages anticipated were fully realized, and the Administration Report proved that the saving in cost of carriage was considerable.

Berar.—Attention, as in previous years, was given to work under this head. Of R9,143 expended by the Forest Department on communications, R6,164 represents the cost of new works. Various roads were under construction or consideration. R2,23,884 were spent by the Public Works Department on the new Gugumal forest road which was expected to be shortly finished. On buildings, wells, etc., the amount spent by the Forest Department was R5,005. The total expenditure incurred by the Department was R14,844, as against R21,498 in the previous year.

Madras.—The expenditure upon communications and buildings was as follows:—

	Northen Circle.	Southern Circle.
	R	R
Roads	9,020	21,390
Buildings	15,447	22,301
Other works	548	234
TOTAL .	25,015	43,925

In reviewing progress made during the year, the Government of India expressed their concurrence in the opinion of the Local Government that the expenditure incurred on lines of communication and export was insufficient. It was pointed out that the total cost incurred during the year amounted to 3·8 per cent. on the gross revenue, which rate is in excess by 2 per cent. of the average for the whole Empire. The cost in Madras, however, of forest roads in 1890-91 was considerably less than that of buildings, which are relatively less important. The desirability of forecasting the requirements in respect of forest roads in each locality, and of preparing a general project for the development of communications extending over a number of years, was suggested to the Local Government.

Bombay.—The expenditure incurred by the Forest Department on roads and buildings is reported as follows :—

	Communications.	Buildings.
	R	R
Northern Circle	526	3,045
Southern "	2,367	3,267
Sind "	...	696
TOTAL .	2,893	7,008

The sums spent by the Forest Department on the improvement of communications are quite insignificant as compared with the total income of R32,88,000, and are almost entirely required to keep the existing roads in decent repair; but it is pointed out in the reports of the Southern and Northern Circles that a good system of public roads already exists in the more important districts of the presidency, and that this system is constantly added to and improved at the expense of the Provincial Service Budget.

The amount spent on district roads, which have been projected in consultation with the Forest Department, amounted in the Northern Circle alone to nearly a lakh of rupees. The construction of such roads doubtless tends to bring the forests into touch with the markets and reflects considerable credit on the administration, but it is for consideration whether greater efforts should not be made by the Forest Department in supplementing them by a system of internal forest roads constructed on a preconsidered and well-defined plan.

CHAPTER II.

PROTECTION AND IMPROVEMENT.

I.—General Protection.

13. The following table shows for each province the number of breaches of the forest law noticed during the year, the sum total amounting to less than one offence for every 3 square miles of forests under the control of the Forest Department:—

Province.	Number of new cases taken into Court.		Number of cases compounded.		Total.		Proportion of convictions to the total number of cases decided by the Courts.	
	1890-91	1889-90.	1890-91	1889-90.	1890-91	1889-90.	1890-91.	1889-90.
							Per cent.	Per cent.
Bengal	203	120	1,959	2,524	2,162	2,644	87	80
North-Western Provinces and Oudh	169	110	759	696	928	806	89	90
Punjab	1,211	1,106	909	880	2,120	1,086	82	78
Central Provinces	210	293	7,870	8,261	8,080	8,554	73	75
Burma (Lower)	250	341	700	899	950	1,240	89	94
Burma (Upper)	83	99	115	47	198	146	71	81
Assam	115	163	219	285	334	448	73	82
Coorg	6	12	7	...	13	12	83	62
Ajmere	62	31	177	205	239	236	98	97
Baluchistan	75	4	9	4	84	8	99	...
Andamans	...	...	...	...	...	...	...	...
Total	2,384	2,271	12,724	13,801	15,108	16,080	83	82
Berar	416	381	...	...	416	381	85	84
Total Bengal Presidency	2,800	2,660	12,724	13,801	15,524	16,461	83	82
Madras	5,036	2,333	2,051	1,698	7,087	4,031	79	70
Bombay	1,638	1,666	10,951	8,474	12,589	10,140	77	81
GRAND TOTAL	9,474	6,659	25,726	23,973	35,200	30,632	80	78

Bengal.—A considerable increase took place in the number of forest offences brought before the Courts, and a corresponding increase in the percentage of convictions which stands now at 87. The number of undetected cases was also diminished six-fold. From the Conservator's report it is gathered that the large decrease in the number of cases compounded is due to more efficient control, especially in the Sundarbans.

North-Western Provinces and Oudh.—There was a large increase both in the number of cases prosecuted in the Courts and in the number of those compounded. The increases occurred in all the Circles, especially in the Central Circle, where the cases were more numerous by 55 per cent. With reference to the remarks contained in the Review for 1889-90, the Local Government attributed the increase of forest offences to an enhanced vigilance on the part of the forest police. The number of cattle impounded for illegal grazing also showed an increase on the figure of the previous year.

Punjab.—There was an increase in the number of forest offences brought into Court of 105, as against the previous return. The number of compositions accepted was also greater, the average sum taken as composition being R4. The percentage of convictions obtained was increased, and was 14 per cent. in excess of the figure for 1888-89. In his review of progress made during the year His Honour the Lieutenant-Governor adverted to the necessity of carefulness and moderation being exercised in compounding forest offences.

Central Provinces.—The result attained during the year under this head showed that there were considerable diminutions both in the number of cases brought into Court and in the number compounded, but it seems doubtful whether this was due to an actual decrease of offences, or to a decline in the vigilance of the protective staff; for the percentage of convictions obtained was also lessened on the figures of 1888-89 and 1889-90. The above statement will

indicate how the results compare with those obtained in other provinces. In the Northern Circle offences were more numerous under all heads, with the exception of those connected with injuries to the forest by fire. The decreases in both Circles in the number of offences of the latter description was the most satisfactory feature of the year's administration in this direction.

Burma.—Here also the number of cases prosecuted or compounded declined considerably, and with it the percentage of convictions obtained, which was reduced from 94 to 89 per cent. In the South Tenasserim Division, out of 40 persons prosecuted, only 28 were convicted, and the Chief Commissioner directed that greater care should be taken in instituting prosecutions. The number of cases brought under notice was on an average less than one for every 5 square miles of reserved area, and most of the offences related to thefts of forest produce. R10,723 were realized from petty offenders as compositions.

In Upper Burma also the number of cases prosecuted in Court, as well as the percentage of convictions obtained, showed a considerable decline on the previous figure.

Assam.—The number of new cases prosecuted in Court indicates a decrease of 29 per cent. on the figures for 1889-90, while the percentage of convictions fell by 9 per cent. These decreases must be considered unsatisfactory, and, it may be hoped, are not to be attributed to inefficiency on the part of the forest staff. The number of cases compounded showed a decrease of 23 per cent. on the previous return. Of the latter class of cases, 13 were on account of offences connected with the firing of the forests, and this procedure was adversely criticised by the Supreme Government when reviewing the year's progress.

Coorg.—With reference to the remarks recorded in the Review for 1889-90, it is to be regretted that, in the matter of intentional firing of the forest, offenders were not detected, although this does not appear to be due to any fault on the part of the protective establishment. Only 6 cases of breaches of the forest law, involving 8 persons, were prosecuted, or only one case for every 50 square miles of forests. Offences not connected with incendiarism are, therefore, judging from the Deputy Conservator's report, no hindrance to a successful management of the forests.

Ajmere.—The number of offences remained almost unchanged as compared with the previous year. A greater number were prosecuted in Court, but fewer cases were compounded than in 1889-90. The average compensation accepted in compounded cases was increased, and the reason for this was ascribed to the fact that most of the offenders were twice convicted of the same offence. It may be argued accordingly that the punishments or procedure adopted were inadequate or unsuitable.

Baluchistán.—The number of cases was 75, as against 4 in 1889-90. The offences committed were mostly of a petty nature—breaches of rules made under the forest law—and were met with trifling punishment. It is satisfactory to observe that the new rules were enforced with little trouble.

Andamans.—The few breaches of forest rules were punished as convict offences by the officers of the Settlement.

Berar.—The prosecutions for forest offences increased in number from 381 in the preceding year to 416, and the percentage of convictions obtained was also slightly increased. In continuation of the remarks contained in the Review for 1889-90, the fact that no special attention was paid during the year to undetected cases is matter for regret, and invalidates, it may be thought, the reasons given by the Conservator for the decrease in the number of offences prosecuted before the tribunals.

Madras.—The Administration Reports indicate that a considerable improvement took place. The new cases of the year showed an increase of 1,543 on the previous return, two-thirds of the increase being in the Southern Circle. The percentage of convictions obtained was increased by 9 per cent., but the percentage, as the above table will show, is still comparatively low, and there is reason to believe that there is room for much better results which, it is anticipated, will be realized as soon as the reorganisation of the protective staff is carried into effect.

Bombay.—The number of cases brought into Court has remained almost stationary, but the proportion of convictions fell, as compared with the previous year, from 81 to 77 per cent. There was a considerable increase of offences compounded. The report of the Southern Circle would seem to indicate the existence of a considerable amount of uncertainty regarding the correct interpretation of the forest law, and the remarks made by the Conservator of this, as well as of the Sind Circle, to the effect that the main danger to forest conservancy lies in the aggregate of trivial offences which it is difficult to discover, require serious consideration, and cases brought home to the offenders should not be dismissed on account of their triviality.

II.—Protection from Fire.

15. The areas successfully protected from fire amounted during the year to 23,144 square miles. This was achieved at a cost of R2,19,070, and the area protected does not include those forests which are not subject to annual conflagrations.

It has not as yet been possible to arrive at an estimate of the total area to which fire-protection by special measures must be finally extended, but everything tends to prove that the areas which escape annually recurring conflagrations without special protection, though of course subject to fluctuation in accordance with the character of the season, are steadily increasing :—

Provinces.	Area in square miles.				Proportion of failures to area attempted.		Cost				Proportion of area under fire-protection to total area of reserves (Leased Forests included).	
	Attempted.		Protected.				Per square mile protected.		Per acre protected.			
	1890-91.	1889-90.	1890-91.	1889-90.	1890-91.	1889-90.	1890-91.	1889-90.	1890-91.	1889-90.	1890-91.	1889-90.
					Per cent.	Per cent.	R	R	Pies.	Pies.	Per cent.	Per cent.
Bengal . .	1,464	1,217	1,389	1,159	5	5	11	13	3	4	28	23
North-Western Provinces and Oudh (a)	2,276	2,199	2,209	2,075	3	5	18	18	5	5	62 (b)	60(c)
Punjab . .	355	427	352	334	0·8	22	4	7	0·7	2	6(d)	7 (d)
Central Provinces .	36	2,887	3,090	2,712	5	6	16	13	5	4	16	1
Burma (Lower) .	447	379	368	374	18	1	64	52	19	16	9 (e)	7 (e)
Burma (Upper) .	1,181	12	164	6	86	50	0·8	12	0·2	4	7 (d)	0·1 (d)
Assam . . .	1,141	1,057	1,070	681	6	36	20	18	6	5	32	30
Coorg . . .	204	202	160	196	22	3	28	22	9	7	83	84
Ajmere . .	140	139	140	139	...	...	·5	2	0·16	1	100	100
Total .	10,444	8,519	8,942	7,676	14	10	17	17	5	5	...	...
Berar . . .	1,111	1,059	1,085	1,043	2	2	7	7	2	2	98	100
Total, Bengal Presidency (f).	11,555	9,578	10,027	8,719	13	9	16	16	5	5	...	...
Madras . .	4,928	4,609	4,700	4,395	5	5	9	8	3	2	(g)	(g)
Bombay . .	10,344	10,638	8,417	9,130	18	14	2	1	0·59	0·44	(h)	(h)
GRAND TOTAL	26,827	24,825	23,144	22,244	14	10	9	8	3	3	...	...

(a) Fire-protection in the Central Circle extended over *Protected forests* as well as reserves, and in that Circle the area attempted to be protected included tracts for which no special fire-protective measures were taken.

(b) In Oudh 64 per cent., in School Circle 79 per cent., in Central Circle (taking Reserved and Protected forests into account, as done by the Conservator) 52 per cent.

(c) In Oudh 64 per cent., in School Circle 78 per cent., in Central Circle (taking Reserved and Protected forests into account, as done by the Conservator) 46 per cent.

(d) Proportion of area under fire-protection to total area of all forests.

(e) Taungya areas not included.

(f) Fire-protection was extended to Protected forests (Reserved lands) as well as reserves, including Leased forests, and the area attempted to be protected included tracts for which no special fire-protective measures were taken.

(g) No comparison possible, as the area attempted was greater than the area of reserves.

(h) No comparison possible, as areas proposed for reservation are also included in the area attempted.

Bengal.—With reference to the remarks contained in the Review for 1889-90, it is satisfactory to be able to record that the results of fire-protection were generally good. Disastrous fires took place in the Jalpaiguri and Angul Divisions, and in both cases the personal control exercised by the Divisional Officers seems to have been insufficient. But, as the above table indicates, there was upon the whole a marked improvement in the result achieved.

North-Western Provinces and Oudh.—The result of fire-conservancy may be considered good, but the season was, generally speaking, unfavourable to fires. The delay in the breaking of the rains necessitated, however, the continuance of operations in the Central Circle for a period of three weeks in excess of the average. Although the area over which protection was attempted was increased by nearly 50,000 acres, the failures amounted to less than one-half of those of 1889-90. In the Oudh and Central Circles, the burning of large areas of forests was attributed to incendiarism, and steps for the prevention of such attacks on the State forests were under consideration after the close of the year. Exclusive of the areas entered in the

above statement, the protection of 72,538 acres of open forest in the Oudh Circle was attempted, but nearly one-half of that area was burned over.

Punjab.—The fire-protection of the forests was unusually successful, but the conditions were exceptionally favourable. The area over which protection was attempted decreased by 72 square miles, and the failures were less by 90; consequently the area actually protected was greater by 18 square miles as compared with the results of 1889-90. The cost of protection per square mile was very materially decreased, *viz.*, from R7 to R4. The forests of the Hazara and Rawalpindi Districts, where fires are usually prevalent, almost entirely escaped. In reviewing the year's progress, the Government of India remarked on the steps which should be taken in order to ensure amelioration of the evils caused by wilful incendiarism. The necessity for the protection of forest property, the maintenance of which is as beneficial to the adjacent population as it is to the general public, and for the meting out of appropriate punishment for forest incendiarism whenever it can be discriminately imposed, was commented upon.

Central Provinces.—The results of fire-conservancy were, generally speaking, satisfactory. The area over which operations took place was considerably extended during the year; yet the proportion of failures was reduced by 1 per cent. The cost per square mile was increased by R3, this being due to excessive and partially unfruitful expenditure in the Bilaspur and Raipur Districts of the Southern Circle. Both Conservators reported that conflagrations in specially protected areas are due to incendiarism, and the policy of making prompt payment to villagers for services rendered in extinguishing fires can be strongly recommended in order that the people may be directly interested in forest protection. Upwards of two-thirds of the area of forests not specially protected escaped fires, and this fact affords good evidence of the progress that forest administration in these provinces is making.

Burma.—Fire-protection was not nearly so successful as during the previous year, this being ascribed to unfavourable weather-conditions. The figures in the above statement indicate approximately the results of the two years. In the Pegu Circle the majority of the fires were caused either wilfully, or through the carelessness of the Karen taungya-cutters, and special protective measures in this direction are under consideration. In their review of progress, the Supreme Government suggested that the position and limits of forests liable to conflagrations, as distinct from those naturally protected, should be recorded on special maps.

The figures for Lower Burma recorded in the general statement given above have been extracted from the Administration Report, but are somewhat misleading. The area specially protected by means of fire-lines remained the same as in the previous year, and in the Ruby Mines District 5,590 acres were protected by means of fire-watchers. Over the rest of the area there was no special protection and no expenditure, so that average figures must be illusory. Fire-protection in Upper Burma is as yet in its infancy, and it will be advisable to carry out protection over areas which have been carefully selected, so that a fair prospect of success may be afforded.

Assam.—The results achieved were satisfactory, but must in great part be attributed to a largely increased expenditure, the reasons for which were not reported. The area over which protection was attempted was increased from 1,057 to 1,141 square miles, yet the proportion of failures decreased from 36 per cent. to 6 per cent. It should be remembered however (*vide* Review for 1889-90) that the previous year was exceptionally unfavourable. As regards cost, while the area "attempted" was increased by 8 per cent., the expenditure incurred rose by 69 per cent., *viz.*, from R12,368 to R20,872, and the cost per square mile from R18 to R20. The average charge per square mile protected was thus increased by R2. This, in view of the fact that the area burned in 1889-90 was exceptionally large, requires explanation, which it is understood will be furnished in the report for 1891-92.

Coorg.—It is to be regretted that fire-protection was not so successful as in 1889-90 which, however, was an exceptionally favourable year. The figures in the above statement will indicate that while the area "attempted" was increased by 1 per cent., the proportion of failures was swelled by 19 per cent. No doubt this comparative failure was mainly due to an unfavourable dry season, but there was also wilful firing of the forests. In reviewing the year's progress the Government of India endorsed the Chief Commissioner's suggestion that whilst effort should be made to bring the people into sympathy with forest conservancy by removing grounds of discontent, forests in which the occurrence of incendiarism is suspected with good reason should be closed entirely to all rights or privileges.

Ajmere.—With reference to the remarks in the last Review, a still further improvement took place in the direction of fire-protection. The fact that no fires occurred is no doubt due to the scantiness of the grass-crop of the year, and to the large number of animals admitted to graze in the reserves. The cost of protection per square mile was reduced fourfold, and was inferior to that incurred in any other part of India during the year under review.

Baluchistan.—No fires took place in the State forests, and it was reported that firing of the unreserved areas had much decreased during the year.

Berar.—Although the general results of fire-protection were not quite so successful as during 1889-90, the year's work was not unsatisfactory, the unusual dryness of the fire season being taken into account. An addition of 42 square miles was made to the area protected, which was 1,085 square miles. All the demarcated State forests, the protection of which is necessary, were, it is understood, protected, the balance amounting to 2 per cent. Out of 1,111 square miles of which the protection was attempted, fires extended over 26 square miles, or 2 per cent. The expenditure per square mile of area attempted was R7-2-0, being an increase of 2 annas on the previous figure. In the Wun and Amraoti Districts fire-protection presents special difficulties and was not successful during the year.

Madras.—The results of fire-protective measures were satisfactory, especially in the Southern Circle. Out of 4,928 square miles of which conservancy was attempted, only 228 square miles, or 4·6 per cent., were burned. The cost rate per square mile, however, which had steadily declined since 1887-88, rose during the year to R9, the increase being attributed to an unusually dry season. The remarks made by the Board of Revenue, when commenting on the operations of the year, to the effect that greater method and discrimination appear to be needed in selecting areas for permanent fire-protection, should, if acted upon, produce good results. There can be little doubt that the results achieved in this direction in the Presidency forests are capable of considerable improvement; and the very pertinent observations recorded by the Board are fully applicable in all parts of India where fire-conservancy of the forests is attempted

Bombay.—The results of fire-protection given in the table below were, as usual, satisfactory, especially as the area which escaped fire in the Southern Circle, without special measures having been adopted for its protection, is reported to have amounted to 79 per cent. of the whole forest area, or, including the 14 per cent. specially protected, to 93 per cent. :—

Circles.	Area in square miles			Proportion of failures to area attempted.	Cost		Proportion of area under fire-protection to total area of reserves.
	Attempted	Failures	Protected		Per square mile protected.	Per acre protected	
				Per cent	R	Pies.	Per cent
Northern . . .	8,705	1,914	6,791	22	½	0·07	...
Southern . . .	1,059	9	1,050	0·8	14	4 22	56
Sind	580	4	576	0 7	...	...	59
Total .	10,344	1,927	8,417	18	2	0·59	...

* No comparison possible, as areas *proposed for reservation* are also included in the area attempted

III.—Grazing.

15. Grazing, as has been frequently stated, is doubtless the most wasteful manner in which a fodder-crop can be reaped, and as agriculture advances its importance falls more and more into the background. Moreover, grazing in the forests to be maintained under tree-growth has the further disadvantage that by it the development of young growth is either destroyed or impeded. The present agricultural development, however, of the greater portion of the Indian Empire is not sufficiently advanced to permit anything else than a gradual restriction of the previous custom, under which the herds, unrestricted as regards numbers or seasons, roamed over the whole of the unoccupied areas.

Lands which, for one or other of the various reasons which demand such a course it is desirable to maintain or place under forest growth, doubtless require a different treatment from those which can, without prejudice, be utilized *primâ facie* as pasture lands; for, as regards the former, it is imperative that a considerable portion should be closed periodically for a time of sufficient length to allow of the establishment of reproduction and its growth beyond the reach of danger from cattle; whereas, in the case of the latter, it will suffice to close the areas for the period during which the grass is growing. In either case it is

necessary for a rational treatment that the number of cattle admitted and the period of such admission should be further restricted in proportion to the possible fodder-yield of each area.

In whatever category the waste land belonging to the State may be classed in accordance with the policy promulgated by the Government of India, it is necessary that endeavours should be made, as far as circumstances permit, to ensure eventually its systematic treatment. This may, especially as regards areas subject to grazing, not always be possible in the immediate future. Similarity, for example, may be inevitable, at the outset, in grazing regulations. But in such a case it is important that the regulations should be provisional in character, and capable of amendment to suit altered conditions and requirements. Great caution should, in particular, be exercised in the grant over reserved forests of grazing privileges, either free, or at rates differentiated in favour of agricultural cattle or of cattle belonging to villages adjoining forests. Besides the injury to revenue resulting from the grant of such privileges, administrative embarrassment may be caused when it is considered desirable to withdraw them. Difficulty has also been found distinguishing between privileged and other cattle. This difficulty, however, might to a great extent be met by demanding in the first instance the same fee from all cattle except those of *boná fide* right-holders, and by refunding the same or part thereof through the revenue administration to such persons as the Government may declare to be privileged.

16. The following details for each province indicate that some progress has been made with regard to the regulation of forest grazing :—

Bengal.—The Administration Report for the year shows that the area of reserved forest open to grazing, *viz.*, 947,216 acres, or 28·5 per cent. of the total area, underwent no change during the year. The number of grazing animals admitted was not reported, so that it is impossible to gauge the intensity of the grazing. Again, while in certain divisions all the reserves are grazed over, in others grazing is either prohibited or is allowed in only a small fraction of the area. Continuous grazing should be arrested, whenever possible, in the case of forests which have undergone deterioration, but the necessity of providing for the just requirements of the people cannot be overlooked. Only by alternating the areas over which grazing extends can the necessary evils be greatly mitigated. The periods of rest should be sufficiently long to permit of the growth of young crops being assured.

North-Western Provinces and Oudh.—The reports indicate the percentages of area in each Circle which were open to grazing, but the information afforded is insufficient to enable a judgment to be formed as to how far the interests of the forests are affected. The total number of cattle admitted to graze was 662,761, and R1,04,595 were realized from grazing dues. The percentages of area closed to the total area of the forests were 52·14, 45·18, and 29·06 in the Central, Oudh, and School Circles respectively. In the School Circle the grazing rules were reported as inconvenient, and the question of their amendment was raised; and, if this be done, the opportunity should, if possible, be secured of rendering them more in harmony with the acknowledged principles of sylviculture.

Punjab.—Very interesting statistical information on this subject was recorded in the Administration Report for the year, but the number of animals admitted was not given. The total area affected by grazing was 1,751 square miles, or 29 per cent. of the total area of forest controlled by the Forest Department. Of this percentage, 15 per cent. was entirely closed, and 14 per cent. partially closed to grazing. Over 4,213 square miles, or 71 per cent. of the gross area, grazing was wholly unrestricted. In their Circular Resolution No. 21 F., dated 12th July 1889, the Government of India recorded their views on the subject of the effect of sheep and goat browsing in forest lands, and stated that such browsing was incompatible with efficient forest administration. The Local Government decided during the year not to issue rules regulating this question; but the subject is one of great importance to the forests of the province, and it does not appear with certainty that conditions have been materially bettered during the past few years.

Central Provinces.—The area entirely closed to grazing was considerably augmented

during the year, and stood at 2,044 square miles, or something more than 10 per cent. of the total area of forest controlled by the Department. An additional area of 1,000 square miles was closed to browsing animals. The number of animals grazed was 2,820,556, and the grazing income amounted to R4,82,179.

The regulation of grazing in the forests, especially when the wood-crops are young, or are being regenerated—a question of great economic interest in these provinces—was under the consideration of Government during the year. Until, however, the forests can be systematically exploited for major produce, and the license system abandoned, the matter cannot be satisfactorily settled.

Burma.—As was stated in the previous review, the grazing question in this province is of minor importance, and the fees realized are trifling in amount. The question of abolishing the grazing fees altogether in the Pegu Circle was raised during the year; but it is for consideration whether such a course would not prove a source of danger in the direction of forest fires. In view of the small revenue realized from grazing, the inconvenience or annoyance to the people caused by the collection of grazing fees is probably inconsiderable.

Assam.—This subject as regards the forests is of little practical importance in Assam, and was not treated of in the Administration Report for the year under review.

Coorg.—The regulation of grazing in the North Coorg reserves received special attention during the year, and the proposal made to close 28 per cent. of these forests is a step in the right direction. The Forest Officer reported that the grazing rules, by which all the cattle were excluded from the forests on the 1st of January in each year, pressed hardly on the people, and the Supreme Government, when reviewing his report, suggested that the present time appeared suitable for a general revision of all the grazing rules. The animals grazed in the reserves during the year were 13,195 in number, of which 9,643 were admitted of right, and dues were paid for the remainder.

Ajmere.—The monsoons of 1889 were slight, and it was considered advisable to permit more extensive grazing in the reserves than had previously been allowed. The number of cattle admitted increased from 14,684 in 1889-90 to 26,359 in the year under review. The cutting of grass was allowed during one month only instead of four, so as to allow of more fodder being available for grazing animals, and to this cause must be attributed the large decrease in the quantity of grass cut and removed free of payment, which was 82 per cent below that removed in the preceding year. Since the scarcity of fodder experienced in 1878-79, efforts have been made in the direction of a more conservative treatment of the forest by favouring the utilization of the grass crop by cutting instead of by grazing. It is, therefore, regrettable that this policy was abandoned during the year to a considerable extent, and the proposal made by the Commissioner that, in all fodder reserves, grazing should be allowed subject only to restrictions as to the maximum number of cattle to be admitted, would not appear to be one based on economic principles.

Baluchistan.—The Administration Report for the year contained insufficient information regarding areas open or closed to grazing animals. The Ziarat and Quetta forests, together with a few scattered areas, were closed to grazing.

Andamans.—There is no grazing in the forests.

Berar.—As was the case during 1889-90, grazing was prohibited in all the State forests, with the exception of those in the Buldana District, where other grazing land is very limited in extent. It was reported that the grazing scheme, alluded to in the last Review, would be considered when the forests have been classified in accordance with the new forest law.

Madras.—As was the case in previous years, sufficient information was not furnished by the Conservators regarding areas available for free-grazing and those closed to grazing. Although the grazing fees have been raised, the revenue from this source continued to rise, and amounted during the year under review to 1½ lakhs of rupees. In contradistinction to the views of the local authorities in Ajmere, the Madras Government recorded its opinion that it is not always advisable to throw open the fodder reserves to free-grazing in dry seasons, and that it was not the duty of the State to provide free grazing for an unlimited number of cattle, many of which are of no service for agriculture, except as producers of manure. Most of this manure is lost in the forest, and there can be little doubt that these views will commend themselves to those who have studied the question and seen the results of the policy of endeavouring to provide sufficient fodder for half-starved animals, thousands of which must inevitably succumb in seasons of drought.

Bombay.—The grazing revenue in this Presidency amounted to R4,91,668, distributed amongst the Circles as follows :—

	R
Southern Circle	72,809
Northern "	3,61,984
Sind "	56,875

The area closed against grazing in the Southern Circle has been increased by 271 square miles. The report of the Northern Circle contains a reprint of the grazing, rules framed for the Bombay Presidency. These rules are on the whole satisfactory, especially in so far as they restrict the number of cattle which are allowed to graze in each unclosed portion of the forests, and virtually exclude goats from all State forests. In consideration of the lowness of the rates a further differentiation would hardly seem necessary, but this is merely a financial consideration. The closure of the open compartments during part of the year, whilst the new grass is growing, is a decided step in advance, and of importance not merely to the forest administration but to the cattle-owner. The remarks in regard to free grazing, made in the Sind Circle Report, require the most serious consideration, as the Forest Act clearly provides that no expanding grazing rights shall be admitted under a forest settlement.

IV.—Reproduction.

(a) *Natural.*

17. As India contains all climates, from the Arctic, where vegetation ceases, to the tropical home of the tree-ferns; from the most arid desert, where a few thorny long-rooted bushes have established themselves under favourable circumstances, to the steamy atmosphere of the caoutchouc-yielding forests—natural reproduction is as variable as the conditions themselves. In the moist tropical forests it is the superabundance of reproduction which the forester has constantly to combat, whereas, in the arid zones, regeneration can only take place under exceptional circumstances and in exceptional years.

It may be accepted that the success or failure of natural reproduction depends, in proportion with the dryness of the climate, on successful protection from fire and grazing and from the removal of vegetable mould or of the leaves which form this mould by their decomposition. To prevent fires and to prohibit or regulate grazing and the removal of mould as far as is compatible with other circumstances, is consequently one of the most important duties of a forest administration. It is not, however, merely forest reproduction that the Indian forester has to secure, but the right kind of reproduction; and this is a problem which presents frequently the greatest difficulties, and is, under existing circumstances, sometimes unattainable. Much can, however, be done in directing the course of the process of reproduction into the desired lines by felling or girdling round trees of the species it is intended to foster with a view to establishing groups of advance-growth of the more valuable kinds.

Such girdling should take place even around younger trees of the favoured species, in order to allow of their maturing at an earlier age than would otherwise be the case.

The reports, almost without exception, contain insufficient information regarding the steps taken to regulate natural reproduction, and it is desirable that they should be amplified in this respect in the future.

Bengal.—The condition of the forests as regards natural reproduction was reported during the year to have been generally satisfactory. Experiments were made in the Darjeeling district to encourage reproduction of the more valuable species by cutting out undergrowth of *Strobilanthes pectinatus*, and the results were excellent.

Wherever fires and grazing are sufficiently regulated, natural reproduction is good. The remarks made by the Conservator regarding the production of sâl are of special interest, and that forests of a vastly improved character will result from the treatment proposed there seems no reason to doubt. It will be interesting to note the result of the methodical removal of undergrowth, and the thinning out of inferior species. Creepers, especially in the Terai, are a grave hindrance to the development of the forests, and efforts to remove these pests should be continued.

North-Western Provinces and Oudh.—Nothing of special interest or importance has been recorded on this subject in the Administration Report for the year. In the Central Circle,

the experiment of setting fire, during the early months of the year, to the *chir* forest in order to render their protection from conflagrations more easy during the dry season was a failure because of the injury caused to the young crops.

Punjab.—This subject was dealt with at considerable length in the Conservator's report, but the facts recorded are somewhat difficult to summarize. The experiment, made with a view of improving the growth and reproduction of *jhand* in the *bar* lands, indicates that it is impossible to expand them into a regular method of treatment. The Conservator reported that certain villages in the Jhelum District understood the advantage derived from a closure of the forests to grazing, and the Supreme Government, when reviewing the report, suggested that it should be ascertained whether similar views were held by the people in other parts. From Chamba it was reported that natural reproduction had suffered considerably owing to the reserves having been leased for grazing to the Raja of that State.

Central Provinces.—The reports from both Circles tell the oft-repeated tale of natural reproduction being good wherever fires and grazing are excluded from the forests. It was stated that in several localities bamboos had ceased to grow owing to three successive bad monsoons, but the question as to why the growth of these species was retarded would not appear to have been sufficiently studied, and it seems possible that the causes of their decay may be attributed to approaching flowering.

Burma.—The report of the Tenasserim Circle contained remarks on the subject which, though no doubt true, are too general, and contain little that is not already known. And, again, there is nothing to show that the principles set forth have been put to practical use. It is evident that where the working is restricted to one or a few valuable species, special measures must be adopted to promote their reproduction and to foster the species, especially in the early stages of their existence. More than 11,000 acres have been treated with the above object in the Tharrawaddy Division, but it does not appear that the same activity was displayed in other divisions of the Pegu Circle.

The Conservator in Upper Burma reported that the reproduction of teak is either absent or inadequate, and that conditions in this respect are not likely to be improved until the forests can be effectually protected from fire. The regeneration of cutch was reported to be excellent in dry forest and in areas under *taungya* cultivation. In the best cutch localities, however, situated in the moister forests, the removal of this species does not sufficiently interrupt the cover and thus allow the young growth to become established.

Assam.—The Administration Report for the year contains little calling for remark on this question which, as regards the most important species, sâl, continues to be satisfactory. As remarked in the Review for the year 1889-90, natural conditions in Assam forests are such that reproduction depends directly upon the protection of the forests from fire, and protection of this kind has been fairly successful in the province.

Coorg.—The phenomena of small plants on old roots must be considered in connection with the fact that natural reproduction is, to a great extent, dependent on the degree of protection accorded to the forests and to the exclusion therefrom of fire and grazing. Considerable attention was paid during the year to clearing the forests of climbers and to weeding, but the girdling of inferior species was curtailed, probably in order to obtain at first a more complete canopy, following the suggestions of the Inspector-General of Forests.

Ajmere.—In connection with the remarks contained in the Review for 1889-90, and with reference to what has been said above in respect of grazing in these areas, the Forest Officer's report on this subject may be quoted in its entirety. He wrote:—"Natural reproduction by seed entirely failed by reason of scanty rainfall, followed by protracted drought and heavy grazing."

Baluchistan.—Conditions as regards natural reproduction were reported to be generally favourable, but locusts were stated to have occasioned considerable damage.

Andamans.—With reference to the remarks contained in the Review for 1889-90, regarding the insuring of an advance growth of seedlings of padouk previous to the felling of the parent trees, it is disappointing to have to record that nothing was done in this direction during the year under review. The delay, however, has attracted the notice of the Government of India, who, since the close of the year, have directed that steps should promptly be undertaken towards a commencement of this most important work.

Berar.—Interesting information on this subject was furnished in the progress report for the year under review. As in other provinces, the scantiness of natural reproduction in the southern forests of Berar is attributed to incomplete fire-protection, and in this connection the statement made by the Conservator, to the effect that few portions of these areas would appear to have been protected from fire for five consecutive years, is full of significance, and points to the direction in which most effort should be made for the improvement of the forests.

Madras.—This subject was reported upon in full and interesting detail for both the Northern and Southern Circles, and was reviewed at length by the Board of Revenue. The Board pointed out that while protection from fire can be secured by money and labour, that from grazing, in view of the requirements of the agricultural and pastoral population, can be no easy matter, and is indeed the crux of forest work in the Presidency. Where it is possible to separate fuel and timber from fodder areas, the difficulty will not arise, but where such a separation cannot be effected, a reconciliation between the conflicting interests cannot but be a difficult task. Instances of the interesting experiments undertaken with a view to obtain information on the subject of natural reproduction cannot be introduced here, but it is clear that the question generally is receiving due attention in both Circles.

Bombay.—The remarks on natural reproduction made by the Conservator of the Southern Circle are, considering the importance of the subject, extremely meagre, and leave it uncertain whether they refer to the reproduction of the year or the general state of reproduction. The report of the Northern Circle contains interesting and valuable information, especially in so far as it shows that under sufficient protection a certain number of seedlings establish themselves amongst the coppice crops of the different coupes. This is of great importance, as without such reproduction from seed the treatment by pure coppice under standard must, under almost all but very exceptional conditions, lead to a gradual deterioration of forest and soil.

Reproduction in Sind depends on the overflow of the river. Where the water extends merely protection from fire and cattle is required to ensure satisfactory results.

(*b*) *Sowing and Planting.*

18. The following table shows that the cultural operations undertaken by the Forest Department have been more or less successful over an area of 702 square miles. This, however, represents the result of more than twenty years' work, and includes 534 square miles of cultural operations, the greater part of which might with advantage be classed as aids to natural reproduction. The area of plantations is, even after this deduction, considerable in the abstract, but is insignificant compared with the total area of State forests, and thereby shows clearly that such measures cannot be relied on for the regeneration of the forests. The importance, however, of artificially-reproduced forests must not be gauged by their extent only; they contain the most valuable species, and, especially where scattered about in mixed forests, form centres from which the natural reproduction of the better species will spread afield.

PROVINCE.	AREA, IN ACRES.															
	At commencement of the year.				Added during the year.				Excluded during the year.				Balance at the close of the year.			
	Regular Plantations.	Cultural Operations.	Taungyas.	Total.	Regular Plantation.	Cultural Operation.	Taungyas.	Total.	Regular Plantations.	Cultural Operations.	Taungyas.	Total.	Regular Plantations.	Cultural Operations.	Taungyas.	Total.
Bengal	3,012	999	...	4,011	131	139	...	270	...	...	...	...	3,143	1,138	...	4,281
North-Western Provinces and Oudh	2,772	2 948	...	5,720	56	51	...	107	...	101	...	101	2.828	2,898	...	5,726
Punjab	14,201	6,656	...	20,857	373	1,323	...	1,696	361	1,187	...	1,548	14.213	6,792	...	21,005
Burma (Lower)	3,898	3,324	19,606	26,828	17	82	2,629	2,728	...	...	...	...	3,915	3,406	22,235	29.556
Burma (Upper)	4(a)	4(b	...	8	2	...	...	2	1	...	...	1	5	4	...	9
Assam	1,907	168	...	2 075	231	...	...	231	...	...	...	..	2,138	168	...	2,306
Coorg	1,451	10	...	1,461	131	55	...	186	35	...	...	35	1,547	65	...	1,612
Ajmere	531	...	...	531	98	...	...	98	43	...	...	43	586	..	...	586
Baluchistan	521	44	...	565	606	160	...	766	...	32	...	32	1,127	172	...	1,299
Andamans	81	..	...	81	...	45	...	45	...	...	...	...	81	45	...	126
Total	28,378	14,153	19,606	62,137	1,645	1,855	2,629	6,129	440	1,320	...	1,760	29,583	14,688	22,235	66,506
Berar	...	2,381	...	2,381	1,409	1,905	...	3,314	...	620	...	620	1,409	3,666	...	5,075
Total Bengal Presidency	28,378	16,534	19,606	64,518	3,054	3,760	2,629	9,443	440	1,940	...	2,380	30,992	18,354	22,235	71,581
Madras	45,307(c)	5,374(d)	...	0,681(c)	342(e)	969	...	1,311(e)	...	..	...	..	45,649(f)	6,343(d)	...	51,992(f)
Bombay	8,067	246,007	...	254,074	780	72,259	...	73,039	32	1,229	...	1,261	8,815	317,037	...	325,852
GRAND TOTAL	81,752	267,915	19,606	369,273(g)	4,176(h)	76,988	2,629	83 793(h)	472	3,169	...	3,641	85,456(i)	341,734	22 235	449,425(i)

(a) Shown as 2 acres in previous Review, owing to an error in Conservator's Return.
(b) Shown as blank in previous Review, owing to an error in Conservator's Return.
(c) Includes 25,743 acres of topes.
(d) Besides 100 miles of channel banks.
(e) Includes 46 acres of topes.
(f) Includes 25,789 acres of topes.
(g) Includes 25,743 acres of topes in the Madras Presidency.
(h) Includes 46 acres of topes in the Madras Presidency.
(i) Includes 25,789 acres of topes in the Madras Presidency.

Bengal.—Artificial reproduction has no very important place in forest management in this province. The work done, which was principally in the plantations of Darjeeling, Kurseong and Chittagong, was slightly in excess of that carried out in 1889-90. The total cost of new operation and of maintenance was R6,230, as against R5,898 in the preceding year. Attempt, to introduce padouk and mahogany were made or continued during the year.

North-Western Provinces and Oudh.—But little was done under this head in the year under review. The area of regular plantations was increased by 56 acres, and that under cultural operations by 51 acres. The expenditure was R6,825, as compared with R7,958 in 1889-90, the decrease of cost having occurred in the Oudh and School Circles. The sweet chestnut was sown in large quantities in the Central Circle, where, in the hills, it succeeds well, and a number of fruit trees were distributed to villagers in Kumaun. This is a question which the Supreme Government consider of great economic importance, and more is done in this direction in these provinces than in other parts of the Himalaya.

Punjab.—The net addition made to areas under sowing and planting work amounted to only 148 acres, as indicated in the statement given above. Work really, however, extended over an area of 1,696 acres, but 1,548 acres were written off as failures, and the results of operations as summarized in the Administration Report for the year are disappointing. Failures in the Punjab are more extensive than in most other provinces, and there seems some reason to believe that the question of planting and sowing in particular localities has not been broadly considered in its financial aspect. In reviewing the progress made during the year, the Government of India drew attention to this latter subject, stating that expenditure under this head which results in failures is unremunerative capital irretrievably lost. The instance in point—of the Dagshai plantation—adduced by the Supreme Government would appear to have been even worse than it was then considered to be. The total expenditure incurred amounted to R28,125, as against R27,916 in 1889-90.

Central Provinces.—Operations under this head still continued to be of very minor importance, and only R490 was expended on account of such work in both Circles. In the Southern Circle some teak and other important trees were planted in order to improve the composition of the forests, and shade-bearing trees were put out along boundary lines. In the Northern Circle the Conservator reported the work to have been "practically insignificant." The Chief Commissioner, remarking on the year's progress, said that it seemed doubtful whether, in view of the existing weakness in the forest staff, extensive operations are possible. As pointed out in the Review for 1889-90, the work annually done can have no material influence on the forests, and it can only be hoped that the contemplated increase in the establishment will enable a very considerable expansion in this direction.

Burma.—In Tenasserim no new teak plantations were formed, but 1,136 acres of teak taungya plantations were added at a cost of R6-9-6 per acre. In this Circle the area under plantations amounted at the close of the year to 6,904 acres. In the Pegu Circle, 1,366 acres were successfully planted with teak, 13 with cutch, and 114 with teak and cutch together, the average cost per acre being R9-1-6. In this Circle the area under taungya plantations of all kinds amounted at the close of the year to 15,465 acres. The total expenditure incurred in Lower Burma under this head was R49,307, as against R57,059 in 1889-90. There can be no doubt that forest improvement in the shape of taungya plantations of teak and other species will materially increase the available outturn from these forests in the future. There is danger, however, that the young teak or cutch may be suppressed by weeds or quickly-growing species, and it is of importance that planting operations should be so concentrated that the areas concerned may be properly weeded, until the young growth is established.

The report for Upper Burma contains no details under this head, but it would appear that a total expenditure of R3,452 was incurred.

Assam.—While the area actually planted up was considerably less than that of the previous year, the expenditure, *viz.*, R11,855, was slightly in excess. The principal work undertaken was in the Charduar rubber plantation, upon which the charges amounted to R10,089, but the operations undertaken were not sufficiently clearly reported upon. Other works under this head were unimportant, but it is satisfactory to learn of the efforts made to induce ryots to plant up areas formerly *jhumed.*

Coorg.—The area of regular plantations was extended by 131 acres, but 35 acres were struck off as failures. Operations were conducted principally in the teak and sandalwood areas, but the season was unfavourable for all kinds of planting. The Bakka plantation was again burned, for the fourth year in succession, and was destroyed. This plantation has been for the present abandoned. The growth of sandalwood was reported to be good and to compare favourably with that obtaining in similar plantations in Mysore. The area under cultural operations

was extended by 55 acres in various localities, but there is nothing of importance to note in connection with this work. The total expenditure incurred was R6,362, of which R2,022 represent the cost of maintenance only as distinct from new work of the year.

Ajmere.—The area over which sowing and planting work extended, *viz.*, 98 acres, was nearly double that of 1889-90; but 43 acres of previous work were struck off as failures. Sowing work in Ajmere is almost entirely dependent on good rains, and as the season was exceptionally unfavourable, only a small percentage of the seeds germinated. The results obtained by planting were, however, much more satisfactory. The total cost incurred was R929.

Baluchistan.—Sufficient attention appears to have been given to this subject, which is of special interest and importance in Baluchistan. Nurseries were kept in good order, and a large number of plants were issued, while efforts were made to introduce foreign trees. Rupees 1,952 were expended on such works, as against R612 in the previous year.

Andamans.—The Goplakabung plantation was extended during the year by 45 acres, the actual expenditure on this work being at the rate of R20 per acre. The portions planted in previous years were reported to be doing well. The total expenditure was R1,214.

Berar.—The statement prefixed to these notes indicates that the area of plantations and areas subjected to cultural operations was extended by 2,694 acres during the year. But a perusal of the Conservator's report shows that but little seems to have been attempted during the year in this direction. In the Ellichpur District the area of 1,409 acres struck off during 1889-90 as failures from the area of regular plantation was brought on again. The remarks made by the Conservator appear to show that, as was considered possible in the last review, the exclusion of this large area was decided upon without due reason. Of the area of 9,906 acres under cultural operations during 1889-90, and mentioned in the review for that year as having been struck off the returns, 761 acres have been re-entered, and it is assumed that the balance has been permanently struck off. The charges of the year on account of work under this head were only R705, as against R1,506 in the previous year.

Madras.—The area under regular plantations was extended by 296 acres, and that under cultural operations by 969 acres. The total expenditure incurred was R56,638, as against the previous figure of R51,702. In the expenditure of the year is included a sum of R9,966 incurred on topes, principally in the Southern Circle. At the close of the year the total area of regular plantations was 19,859 acres, and that subjected to cultural operations, 6,343 acres. While the total area of all kinds in the Southern Circle remained almost the same as in the previous year, the expenditure was largely increased, this being due, as stated, to blanks, the areas of which are not shown in the returns, having been planted up. In cases of this kind no record is apparently kept of unreproductive capital sunk in the plantations, and yearly information under this head would be instructive. Considerable attention appears to have been given to the subject of artificial reproduction in both Circles. Among the more notable works were the continued planting of mahogany and teak in South Malabar, and an experiment made in Tinnevelly in order to ascertain the results of a combination of forestry and agriculture by sowing the seeds of *Acacia planifrons* along with agricultural crops. The experiment, however, was not successful owing to a failure of the monsoon.

Bombay.—The area of regular plantations was extended by 748 acres only, but, as usual, very extensive areas, amounting to 72,000 acres, were subjected to cultural operations of various descriptions—from actual planting of seedlings down to broad-casting of seed.

V.—Thinnings and Improvement Cuttings.

19. Gradual improvement takes place in the progress made in this direction, and full consideration is given to the importance of the work in all working-plans, so that a more general extension is merely a matter of time. So long as no pre-considered plans exist and the initiative is left to the individual officer in charge for the time being, it frequently happens that works which yield no immediate return are neglected; but it is evident that, as the executive staff is developed and as the Forester, brought up in the traditions of timber-extraction and timber-trade, disappears before the trained Ranger, the future improvement of the forests will receive a greater share of attention.

Bengal.—The damage which climbers do to the forests, especially in the Terai, has been adverted to in the last section. The work done in this direction in Bengal has hitherto been very insufficient. During the year creepers were cut over an area of 11,000 acres in Kurseong, Jalpaiguri, and Buxa, at a cost of R1,424. The question of improvement fellings and thinnings has not been touched upon in the Administration Report.

North-Western Provinces and Oudh.—This subject received considerable attention during the year. In all circles, creepers were cut over an area amounting to 65 square miles. In the Oudh Circle improvement fellings were carried out in various localities, while in the School Circle girdling and thinning operations and the cutting back of ill-formed stems were effected.

Punjab.—The Conservator's report contains but little information under this head. Removal of inferior species or trees were carried out over 4,841 acres in Chamba, while a small number of creepers were cut in the Hazara and Kangra Divisions. In reviewing the Conservator's report, the Government of India directed attention to the importance of work of this description. With reference to the observations recorded in the Review for 1889-90, it is regrettable to observe that the prescriptions of working-plans in force were again not entirely observed.

Central Provinces.—Attention was paid, as in previous years, to the cutting of creepers, but until the system by which forest produce is extracted under licenses, and the more distant areas can be profitably worked, improvement fellings cannot be undertaken on a large scale with financial success.

Burma.—In Lower Burma the usual weedings of teak-taungya plantations were carried out in the Tenasserim Circle over an area of 2,782 acres at a cost of R4,438. Similarly, in the Pegu Circle, 8,646 acres were weeded at a cost of R18,083, and a small expenditure was incurred on creeper cuttings in the forests. The total expenditure in both Circles on account of such works was R22,516.

In Upper Burma it would appear that no operations of this kind were carried out during the year.

Assam.—In the Kamrup and Goalpara Divisions the felling of ill-shapen stems was continued, but elsewhere the traders would not buy such material.

In various Divisions climbers were cut, the area over which these operations extended being 14,835 acres.

Coorg.—It is stated in the Deputy Conservator's Report that the girdling of inferior species in the forests, formerly so much practised, has been much reduced. An area of 1,753 acres were weeded of growth injurious to seedlings, and climbers were also cut. The cost incurred amounted to R344.

Ajmere, Andamans, and Berar.—Nothing on this question has been recorded in the Forest Reports for the year.

Madras.—With reference to the remarks on this subject contained in the Review for 1889-90, it is disappointing to find that, although the special attention of the Conservators was previously drawn to the matter, the importance of improvement fellings has not met with the recognition which should be accorded to it. Even if it be found impracticable to execute such operations upon an extended scale until the constitution of the forests has been more generally carried out, it should nevertheless be possible at once to experiment upon type-areas of forests, and to secure in this manner data which will be invaluable when the time comes to work the forests in accordance with scientific principles. While the statement of the Board of Revenue to the effect that, if growth depends on protection, improvement fellings are essential to forest growth of any value, goes perhaps a little too far, it cannot be gainsaid that the due consideration and execution of any works which can be undertaken in this direction under

existing circumstances in the Madras forests is a matter of pressing importance in the interest of the administration.

Bombay.—To judge from the Conservators' reports, it would appear as if the Northern Circle was the only one in which attention had been paid to this important question.

Here the Protective establishment was largely employed on the eradication of the prickly-pear, creepers, and other noxious growth, and in addition R2,068 were spent in assisting the establishment by hired labour.

CHAPTER III.

WORKING AND OUTTURN.

20. The following table is compiled from the Provincial Reports and exhibits the outturn of the various class of forests. :—

Province.	Reserved Forests.			Protected Forests.			Unclassed Forests.			Average outturn per square mile. Reserved Forests			Protected Forests.			Unclassed Forests.		
	Timber and Fuel.	Bamboos.	Minor produce.	Timber and Fuel.	Bamboos.	Minor produce.	Timber and Fuel.	Bamboos.	Minor produce.	Timber and Fuel.	Bamboos.	Minor produce.	Timber and Fuel.	Bamboos.	Minor produce.	Timber and Fuel	Bamboos.	Minor produce.
	C. feet.	No.	R	C. feet.	No.	R	C. feet.	No.	R	C. feet	No.	R	C. feet	No.	R	C. feet	No.	R
Bengal	19,753,016	5,865,666	81,925	7,964,063	4,018,350	70,546	727,047	10,504,623 (a)	8,836	3,807	1,130	16	3,605	1,819	36	190	2,604	2
North-Western Provinces and Oudh.	10,034,010	16,894,741	2,86,481	490,741	139,820	2,621	118,801	1,186,581	4,179	2,785	4,690	80	5,220	1,467	28	900	8,989	32
Punjab	4,372,908	619,039	1,27,380 (b)	3,023,432	19	1,24,051	24,327,179	43,400	2,12,224	2,581	365	75	8,541	...	353	6,212	11	54
Central Provinces	7,194,637	15,950,889	7,00,332	..	...	...	...	...	...	366	811	36	...	...	...	...	.	...
Burma (Lower)	1,971,100	2,245,555	30,981	...	...	...	11,132,730	..	40,146	334	401	6	...	...	...	Area	not k	nown.
Burma (Upper)	..	...	...	10,743,946	14,882,376	1,97,107	...	...	...	...	...	...	671	929	12	...	...	...
Assam	1,164,113	1,361,500	2,869	606,841	1,701,193	5,853	2,783,755	985,978	53,753	323	375	1	662	1,837	6	509	180	10
Coorg	134,845	481,943	3,827	181,569	64,086	(c) 15,780	...	...	...	546	1,951	15	298	108	26	...	...	...
Ajmere	190,693	2,931	30,850	...	...	...	...	..	...	1,962	31	220	...	...	...	...	...	...
Baluchistan	81,025	...	1,721	...	...	...	64,000	...	...	1,039	...	22	...	...	...	Area	not k	nown.
Andamans	..	...	...	...	...	...	1,655,503	938,969	2,131	...	...	...	...	...	...	846	480	1
Berar	1,517,140	2,170,918	46,933	...	...	...	814,746	1,025,172	5,501	706	1,010	22	...	...	...	381	480	3
Madras (d)	...	...	...	...	...	...	...	...	...	...	..	..	...	...	...	...	..	...
Bombay (e)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

(a) Besides bamboos (the number of which is not reported) removed under permit on the payment of fees amounting to R2,287.
(b) In addition, 18 tons of miscellaneous products, the value of which is not known, were removed as free-grants.
(c) A small portion of this was from Reserved forests.
(d) The forest in the Madras Presidency yielded 15,970,712 cubic feet of timber and fuel, 18,323,447 bamboos, and R6,58,911 worth of minor produce. Dividing these figures by the 17,523 square miles under the Forest Department, a proportion is obtained of 896 cubic feet of timber and fuel, 1,023 bamboos, and R37 worth of minor produce per square mile respectively.
(e) The outturn of the forests in the Bombay Presidency amounted approximately to 33,364,540 cubic feet of timber and fuel; 6,286,825 (besides 7,013 head-loads and 534 cart-loads) of bamboos; and R3,57,463 worth of minor produce. These figures, when divided by the total number (14,480) of square miles in the Presidency, produce an outturn per square mile 2,296 cubic feet of timber and fuel, 434 bamboos (not taking into account the head and cart-loads abovementioned), and R25 worth of minor produce respectively.

Bengal.—The total outturn of timber and fuel during the year from all classes of forests amounted to 28,444,116 cubic feet, or 1,528,888 cubic feet less than in the preceding year. Bamboos to the number of 1,164,151 in excess of the previous outturn were removed, while minor produce to the total value of R1,70,307 was extracted. The total outturn of fuel, excluding free-grants, was somewhat in excess of the previous figure, but there was a considerable decrease in the quantity of timber exploited by Government agency and by purchasers. This decrease is mainly attributed either to the overstocking with timber of the market supplied from the Sundarbans forests, or to the indiscriminate felling of the more accessible areas in these forests and to the exhaustion of the more valuable trees growing upon them.

North-Western Provinces and Oudh.—Timber and fuel to the quantities respectively of 4,196,308 cubic feet and 6,447,244 cubic feet were removed from the forests. These figures include, however, the roughly estimated quantities removed by right-holders and free-grantees. The corresponding figures for 1889-90 were 4,291,848 and 6,412,028. The number of bamboos removed was 427,049 in excess of the previous return. Minor produce to the value of R2,93,281 was extracted, this value being in excess of that for 1889-90 by R17,311. The quantity of timber removed by Government agency and by purchasers, *viz.*, 2,835,000 cubic feet, was 142,000 cubic feet more than in the preceding year, while the corresponding outturn of fuel was increased by 453,000 cubic feet. The outturn of timber alone, however, removed by Government agency, was 226,000 cubic feet in excess of the figure for 1889-90, and the outturn of fuel was also similarly increased by 75,000 cubic feet. There was also a considerable increase in the quantity of fuel removed by purchasers.

Punjab.—The quantity of timber and fuel removed from the forests was 31,723,519 cubic feet solid, or an increase of 4,706,058 cubic feet on the previous figures. This increase was, however, mainly due, as explained by the Conservator, to the employment of more correct

factors of conversion in the case of produce removed by right-holders. The estimated increase from this cause amounted to 6,185,294 cubic feet, so that in reality the year's working, as regards timber and fuel, resulted in a net decrease of 1,479,236 cubic feet. With reference to the remarks on this subject contained in the Review for 1889-90, it is to be hoped that no further change in the method of compiling the returns will be adopted, as comparison of results from year to year are thereby rendered difficult. The outturn from forests worked by departmental agency increased by 349,760 cubic feet, caused mainly by the provisions of the working-plan for the Chamba forests being adhered to. Bamboos to the number of 662,458, and minor produce to the value of R4,64,255, were removed from the forests.

Central Provinces.—The total quantity of timber and fuel extracted during the year was 7,194,837 cubic feet, or 825,595 cubic feet more than in 1889-90. The increase took place both under timber and fuel. Departmental operations, except in the case of fuel in the Southern Circle, were restricted, partly owing to an unfavourable demand, and also because a change in the system, by which produce will be disposed of as it is found in the forest instead of being in the first place removed by departmental agency, was under consideration. The number of bamboos extracted was 15,950,859, as against 9,446,192 in the preceding year. The value of minor produce exported was R7,00,332, or slightly less than during the previous year.

Burma.—In Lower Burma the quantity of timber and fuel removed from the forests was 13,003,830 cubic feet, or 1,742,753 cubic feet in excess of the outturn in 1889-90. The quantity of teak timber worked out from the Tenasserim and Pegu Circles was respectively 12,656 and 48,778 tons, the decreases on the outturns of 1889-90 being 2,326 and 15,705 tons. The diminution in the export of teak was owing mainly to smaller extractions on Government account. The principal diminution occurred in the Tharrawaddy District, and was due to the teak outside reserves having been worked out. Extractions of teak by purchasers under permits rose from 15,002 to 21,225 tons. Of trees other than teak, 7,410 tons of reserved and 19,020 tons of unreserved kinds were brought out of the forests The increase in the outturn of reserved trees other than teak is due to the commendable effort made to introduce pyinma timber to the purchasing public. The number of bamboos removed from the forests, as shown in the above table, was 16,000 in excess of the previous return. The value of the minor produce fell from R1,60,201 to R71,127. With reference to the remarks contained in the Review for 1889-90 on the extraction of cutch, there was a large decrease in the outturn of this product both from reserved and unreserved forests, and a consequent falling off of R90,000 in the revenue realized therefrom.

In Upper Burma the quantity of timber and fuel removed was 10,743,946 cubic feet, as against 10,647,979 cubic feet in 1889-90. The most noticeable features of the year's working were a decrease in the quantity of teak and an increase of unreserved woods, fuel, and charcoal extracted by purchasers, and of teak worked out by departmental agency. The total quantity of teak that passed revenue stations during the year was 1,60,713 tons, as against 1,80,609 tons in the previous year. Minor produce to the value of R1,97,107 was removed, the figure for 1889-90 being R1,38,931. The revenue from rubber and cutch rose respectively from R82,546 to R1,08,678 and from R50,800 to R80,405. Other minor products realised R40,366, as against R33,768 in 1889-90.

Assam.—The outturn from the forests, exclusive of produce granted free, amounted to 1,536,711 cubic feet timber and fuels besides which 2,216,017 bamboos, and minor produce to the value of R62,818, were extracted. The free-grants included 3,017,997 cubic feet of timber and fuel, 1,822,514 bamboos, and R12,095 worth of minor produce. The gross estimated value of the free-grants was R97,004, being a decrease of R25,799 on the return for 1889-90. Only 39,658 cubic feet of timber and fuel were extracted by Government agency; 1,497,053 cubic feet were removed by purchasers, and 3,017,997 cubic feet as free-grants. The total outturn was less than that of 1889-90 by 462,919 cubic feet, the greater portion of the decrease, or 248,544 cubic feet, being due to a diminution of free-grants. The Protected forests yielded an increased outturn of 62,095 cubic feet. The timber and fuel extracted from the reserves showed a diminution of 255,197 cubic feet on the previous return. As in the previous year, more than one-half of the timber and fuel was removed from the unclassed forests. The value of minor produce removed was less by R5,323 than in the previous year, owing to complication in respect of the sale of rubber-mahals.

Coorg.—The gross outturn was:—timber and fuel, 316,414 cubic feet, 546,029 bamboos, and minor produce to the value of R19,557. The timber extracted from the forests was greater in amount by 52,084 cubic feet than that removed in the previous year. The departmental timber fellings were practically in abeyance during the year owing to the stock returns showing

that a quantity of timber, estimated to be equal to the requirements of three years, was lying in the forests. Enquiries showed that the stock was in great part damaged, unsaleable or missing, and fellings have consequently been resumed. Purchasers, however, removed direct from the forests 100,813 cubic feet of timber more than in 1889-90. The removals of bamboos were very considerable, there being a steady increase in the demand for the produce.

Ajmere.—The outturn of timber and fuel was 190,693 cubic feet, being practically the same in quantity as in 1889-90. There were no departmental operations, nearly the whole of the gross outturn having been fuel removed by purchasers. The value of the minor produce removed was R30,850, as against R84,898 in the previous year, the difference being due to less fodder having been collected in consequence of the reserves being thrown open to grazing.

Baluchistan.—The quantity of timber and fuel removed during the year amounted to 145,025 cubic feet, showing an increased outturn of 124,351 cubic feet on the figures of the previous year. No departmental works in timber were undertaken.

Andamans.—Of the outturn given in the above statement, 529,727 cubic feet of timber were removed, being an increase of 196,994 cubic feet on the figures of the previous year. The outturn of fuel also rose by 81,826 cubic feet. As compared with the outturn of 1889-90, there was an increase in the total quantity of produce exported of every kind, with the exception of bamboos. The outturn of timber and fuel was in excess of that of the previous year, which had up till then been the largest, by 278,820 cubic feet, of which nearly two lakhs cubic feet were timber. Two cargoes of padouk, aggregating 1,515 tons, were despatched to London during the year. A portable tramway, which largely assisted in the removal of produce, was laid during the year for a length of one and a half miles.

Berar.—As compared with the returns for 1889-90, there were increases in the quantities of timber and fuel removed of 113,515 and 504,182 cubic feet, respectively, while the number of bamboos cut rose from 2,691,272 to 3,196,090. The value of minor produce extracted remained almost the same. The increase under timber amounted to more than 19 per cent. on the previous figures. No timber was worked out departmentally.

Madras.—The returns show that the outturn from the forests of all kinds of produce was, with the exception of fuel, considerably increased. This was especially the case with bamboos and minor forest-produce, which produced a revenue of more than 1½ lakhs in excess of that for the previous year. In the Northern Circle the quantity of timber and fuel worked departmentally amounted to 1,395,242 cubic feet, as against 972,388 cubic feet in the previous year. In the Southern Circle the corresponding figures are 1,054,181 and 1,049,847. Under private agency 6,141,864 and 7,338,357 cubic feet of timber and fuel were extracted from the forests of the Northern and Southern Circles respectively. The note subjoined to the above statement indicates the gross outturn from the Presidency forests under the three main heads.

Bombay.—Under outturn, the Conservator of the Southern Circle merely gives extracts, division by division, without any attempt at compiling and analyzing the result of the Circle. The outturn of the year amounted to 1,705,000 cubic feet of timber, 5,186,000 cubic feet of firewood, 4,483,000 bamboos, and minor forest produce was extracted to the value of R2,16,140. In the Northern Circle the outturn in timber amounted to 4,910,000 cubic feet, in fuel to 6,109,848 cubic feet. At the same time 1,803,000 bamboos were extracted, and minor forest produce to the value of R61,436. The outturn in timber and fuel per acre amounted in both Circles to very little above 2 cubic feet, which is of course far below the average possibility. The Sind forests produced 226,000 cubic feet of timber, 15,125,000 cubic feet of fuel, and R79,887 worth of minor forest produce. The outturn of wood per acre amounted to 24 cubic feet, a fact which deserves consideration and points to the advisability of examining the possibility of the forests.

CHAPTER IV.

FINANCIAL RESULTS.

21. The following table shows the Receipts and Surplus of the various Provinces, as compared with the averages of the preceding five years :—

Province.	Revenue.		Surplus.		Deficit.		Proportion of Surplus to Gross Revenue (1890-91).	Net Revenue per square mile of land under control of Forest Department (1890 91).
	1890-91.	Average for preceding five years (1885-86 to 1889-90).	1890-91.	Average for preceding five years (1885-86 to 1889-90).	1890-91.	Average for preceding five years (1885-86 to 1889-90).		
	R	R	R	R	R	R	Per cent	R
Imperial . . .	6,370	6,503	...	...	79,044	77,633	...	...
Bengal . . .	7,27,392	6,70,897	3,13,388	2,79,303	...	...	43	27
North-Western Provinces and Oudh .	16,37,879	14,91,893	7,18,684	5,85,385	...	...	44	188
Punjab . . .	8,34,370	9,46,423	1,81,329	2,84,494	...	...	22	30
Central Provinces .	12,13,461	10,84,852	4,77,907	5,12,291	...	...	39	24
Burma (Lower) . .	26,77,671	23,97,089	15,91,197	12,32,236	...	...	59	284
Burma (Upper) . .	16,44,297	(a) 9,47,737	13,41,982	(a) 5,21,736	...	..	82	83
Assam . . .	3,26,793	2,71,872	42,941	48,330	...	...	13	4
Coorg . . .	1,35,561	1,08,928	69,743	35,028	..	...	51	81
Ajmere . . .	15,266	12,086	2,546	...	...	4,811	17	17
Baluchistan . .	15,724	12,534	...	...	13,726	4,535	...	...
Andamans . . .	1,58,326	85,629	28,274	30,079	...	...	18	14
Forest School . .	1,184	630	...	...	34,007	29,531	...	...
Forest Surveys (Imperial) . . .	2,104	204	...	...	22,220	24,546	...	...
Total .	93,96,398	80,37,277	46,18,994	33,88,726	...	...	49	61
Berar . . .	4,87,109	3,80,215	3,18,188	2,07,920	...	...	65	74
Forest Surveys (Berar) .	...	376	...	...	...	31,810	...	...
Total Bengal Presidency .	98,83,507	84,17,868	49,37,182	35,64,836	...	...	50	61
Madras . . .	17,95,408	13,78,623	5,48,495	2,58,155	...	...	31	31
Bombay . . .	32,88,220	30,83,885	14,18,333	12,43,679	...	...	43	98
GRAND TOTAL .	1,49,67,135	1,28,80,376	69,04,010	50,66,670	...	...	46	61

(a) Average for preceding four years.

The table below contains an analysis of the Revenue and Expenditure: —

		R
Gross Receipts	(a) Wood	1,11,78,510
	(b) Minor forest-produce	15,03,187
	(c) Grazing	17,35,157
	(d) Revenue from forests not managed by Government .	2,63,014
	(e) Miscellaneous	2,87,267
	Total .	1,49,67,135

				R	Proportion of Expenditure to Gross Receipts. Per cent.
Expenditure	A.—Recurring	(a) Administration	(i) Superior staff	17,42,055	11 64
			(ii) Subordinate staff (including Rangers, Foresters, and Forest Guards)	12,19,874	8·15
			(iii) Cost of Offices including contingencies)	5,89,199	3·94
		(b) Working	(i) Cost of extraction	25,97,082	17·35
			(ii) Roads and Buildings	2,89,308	1·93
			(iii) Fire protection	2,07,922	1·39
			(iv) Cultural operations	2,90,189	1·93
			(v) Live-stock, store and plant	1,99,328	1·33
			(vi) Working-Plans	60,604	·41
			(vii) Rent for leased forests	1,11,465	·74
			(viii) Miscellaneous	1,30,202	·87
		(c) Expenditure on realization of revenue from forests not managed by Government		8,825	·06
		(d) Forest Science and Education (including all "A" and "B" charges, Forest School)		63,173	·43
			TOTAL	75,09,226	50·17
	B.—Extraordinary	(e) Forest Settlements (including compensation)		136,037	·24
		(f) Forest Surveys		3,97,762	2 66
		(g) Forest Demarcation		1,20,100	·80
			TOTAL	5,53,899	3 70
			Grand Total Expenditure	80,63,125	53 87
			Net Revenue	69,04,010	46·13
					100·00

Bengal.—The gross revenue was R36,326 less, and the charges R15,854 more than in the previous year. The surplus was therefore reduced by R57,180, but nevertheless was considerably in excess of the average surplus for the preceding five years. The fall in revenue occurred in the important Sundarbans Division, and was due to the causes mentioned in the last chapter. In all other Divisions there was an increase of revenue as compared with previous figures, and the decrease in the Sundarbans forests will, it is hoped, be recouped when a working-plan for the locality has been drawn up.

North-Western Provinces and Oudh.—The gross revenue realized in the three Circles amounted to R16,37,879, as compared with R17,51,008 in 1889-90. The charges amounted to R9,19,195 or R43,956 less than in the previous year. The surplus was reduced by R32,324, but was R1,33,299, in excess of the average surplus for the preceding quinquennial period. These results may be considered to be satisfactory. The receipts in the Oudh Circle were the highest hitherto obtained, but there was a falling off of revenue in the other Circles. In the Central Circle the net surplus was only R2,000 less than in 1889-90. In Oudh a reduction of expenditure took place, and the surplus was the highest on record. There is also prospect of a considerable future development of the revenue from these forests. In the School Circle there was a considerable falling off in the receipts owing to less sleepers having been sold, and to there being outstandings of revenue on account of grazing.

Punjab.—There was a considerable diminution of revenue, the figures for the year amounting only to 8,34,370, or R87,343 less than for the previous year. The net surplus was reduced by R94,592, and was below the average surplus for thirteen years. These results cannot be ascribed to any deficiencies on the part of the Department. They were due to large accumulations of stock in depôts, and to a slack demand for timber. The excess of timber remaining unsold at the close of the year was valued at R1,04,000. It may be hoped therefore that the returns for 1891-92 will show that the falling off of revenue has since been compensated for.

Central Provinces.—The gross receipts and charges were respectively R12,13,461 and R7,35,554. In round numbers, the revenue was R57,000 and the charges R39,000 more than in the previous year. The surplus was R18,171 in excess of that for 1889-90, and R34,384 less than the average surplus for the previous five-year period. It may be anticipated that the revenue will expand considerably when the forests are worked in a more systematic manner.

Burma.—In Lower Burma the receipts, charges and surplus, as compared with the figures

of the previous year, showed decreases of R4,57,045, R2,46,370, and R2,10,675, respectively. These results, although disappointing when compared with the favourable financial record of 1889-90, due to the conditions for working having been exceptionally good in that year, cannot really be considered so. The net surplus realized was R15,91,197, as against an average surplus for the previous five years of R12,32,236. The decline of revenue during the year may be partly ascribed to the unsatisfactory condition of the Moulmein teak market, due to a fall of prices in the home markets. For this reason the revenue in Tenasserim, on account of timber extracted by Government agency, was reduced from R4,45,884 in 1889-90 to R2,65,064 in the year under review. In the Pegu Circle the revenue declined by R2,97,836, due to less timber and minor produce having been disposed of.

In Upper Burma the results were likewise inferior to those obtained in 1889-90, but nevertheless must be considered satisfactory. The surplus was reduced by R1,90,288. The decrease of revenue was due to causes which could not be avoided, *viz.*, to an unfavourable floating season which interfered with the extraction of teak; but it is specially satisfactory to observe from the Conservator's report that other sources of revenue, which depend on the efficiency of the Forest Staff, were developed during the year.

Assam.—The gross receipts were less by R52,705 than those of 1889-90, while the charges were R26,724 more. The surplus obtained amounted only to R42,940, little more than one-third of that realized in the previous year, and less than the average of the five years ending 1889-90. The considerable decrease of revenue was ascribed to causes which it is anticipated are of a temporary nature only, but the financial record of the year's working cannot but be considered as disappointing.

Coorg.—The financial results were very satisfactory, the surplus having been the highest on record. The revenue was R42,808 more, the charges R6,602 less, and the net surplus R49,410 more, than in 1889-90. At the close of the year the large sums of R32,619 on account of cardamoms was outstanding in favour of the forest revenues.

Ajmere.—The revenue realized was R15,266, and the expenditure R12,720, as compared with the corresponding figures of the previous year of R11,592 and R12,701. The results are satisfactory, and for the first time since forest conservancy was commenced in Ajmere, a surplus was realised. While the charges remained unchanged, the revenue was increased by 32 per cent., leaving a net surplus of R2,546. The increase of revenue took place chiefly on account of grass sales.

Baluchistan.—The receipts, charges, and deficit of the year were, as compared with the results for 1889-90, increased respectively by R1,826, R11,488, and R9,662. These figures are not very satisfactory, but after the close of the year the Agent to the Governor General drew attention to the fact that the rules, under the recently enacted Forest Law and Regulations, were only in force during a few months of the year, and that better result may be expected in future.

Andamans.—The receipts, charges, and surplus were respectively R1,58,326, R1,30,052, and R28,274. A comparison with the figures given in the previous Review will show that the revenue was R3,869 less, and the expenditure R35,077 more than in 1889-90, the surplus being reduced by R38,947. These figures do not, however, indicate the results of the year. R25,683 were expended as capital outlay upon a tramway for the extraction of produce and in the purchase of elephants, and the value of the padouk stock in London at the close of the year was estimated at R89,810, whereas at the close of 1889-90 it was only R50,000. The working of the year may, therefore, be considered to have resulted in a larger surplus than that realized in 1889-90.

Berar.—The receipts, charges, and surplus were respectively R4,87,109, R1,68,921, and R3,18,188. These figures are very satisfactory. The surplus of R3,18,188 was the highest on record, being only the legitimate outcome of a year's successful administration. While the receipts, as compared with the previous figures, rose by R46,568, the charges were R7,628 less, and the proportion of expenditure incurred to revenue realized has been reduced to 35 per cent. The receipts were swelled mainly by an increase in the sales of timber, including fuel and bamboos.

Madras.—The financial results of the year were extremely satisfactory, and it may be anticipated that, with the contemplated increase in the Forest Staff, the receipts will continue to rise. The gross revenue realized during the year under review was R17,95,408, or more than two lakhs in excess of that of the previous year. The charges rose by R85,676 and the net surplus was augmented by R1,52,105. The revenue realized as well as the surplus were the highest hitherto obtained.

Bombay.—The financial results were highly satisfactory, showing as they do an increase of R1,50,524 in the gross revenue and R51,328 in the surplus.

CHAPTER V.

I.—Establishments.

22. The necessity for the re-organisation of the forest establishment in all its grades had been recognized for some years past, and during the year under review the Inspector General of Forests submitted a complete plan for the re-organisation of the Controlling staff, which was prepared in consultation with Local Governments and Conservators. This plan, which with slight modifications has since been sanctioned by the Secretary of State, was considered by the Government of India during the year under review. The necessity for the re-organization of the Executive and Protective staffs has not been lost sight of, and at the time of writing a scheme, prepared by the Inspector General of Forests, is being placed before the different Local Governments for their final opinion.

Bengal.—The Conservator reported at some length on this subject. The sanctioned staff of Controlling Officers is weak, 30 per cent. of the incumbents having been on leave, supported by certificates of bad health; and had it not been for a re-arrangement of charges, it would have been difficult to carry out special works. One officer was appointed from England during the year. The alleged inferiority of the material hitherto obtained for the Executive and Protective establishments, *viz.*, Begalis, opens out a serious question. The recommendation of the Conservator that recruits should, as far as possible, be obtained from Upper India did not meet with the approval of the Local Government, and it may be anticipated that an improvement in the pay and status of the Ranger-class, which is now projected, will have as one effect that of inducing better candidates to come forward for forest work. Several cases of thefts of Government money took place which reflected on the subordinate establishment, and two guards were dismissed the service. One Ranger was dismissed, and another, convicted of misappropriation of money, was imprisoned. No probationers were sent to the Forest School at Dehra during the year, and the results obtained since 1886 have been most disappointing.

North-Western Provinces and Oudh.—The Administration Report for the Central Circle commented on the unsatisfactory results obtained by sending probationers to the Dehra School. After six years of expenditure in this direction the Circle had, in the year under review, two trained Rangers and seven trained Foresters. Difficulty is experienced in obtaining suitable men as probationers for study. In the Oudh Circle the Executive and Protective staffs are inefficient. A number of Foresters and Guards resigned their duties or were dismissed, or reduced in grade. Several of the staff were prosecuted or criminally punished for dishonesty, and on the whole the condition of the subordinate establishment in this Circle seems to leave much to be desired. As regards the School Circle there is nothing of importance to note. The cry throughout the three Circles is that proper candidates for forest work are not forthcoming, and that consequently the staff is weak both in quantity and quality, but it may be hoped that the impending re-organisation of the service will improve matters.

Punjab.—The weakness as regards numbers of the staff of controlling officers continued to be felt during the year, and necessitated two Sub-Assistant Conservators being placed in charge of Divisions. It is much to be regretted that, for the same cause, it was found necessary to discontinue the employment of the special trained officer at work in the forests of the Simla Hill States, which charge was added to the Bashahr Division, already one of the most extensive and heavily-worked charges in the province. The executive and office establishments on the whole did well, and Sub-Assistant Conservators were very favourably reported on. One Forester and fourteen Guards were dismissed the service. Proposals for a substantial increase in the subordinate establishment, were, after the close of the year, forwarded to the Government of India.

Central Provinces.—The conduct of Rangers was, generally speaking, reported on favourably, but nine Foresters were dismissed in the Southern Circle and four were removed or prosecuted criminally in the Northern Circle. In the lower Controlling and Executive staffs of the Southern Circle three officers gained the Ranger's certificate at Dehra Dun, and four were deputed to the School for study. Thirty-six Guards were dismissed for absence without leave or for desertion. In both Circles the state of the staff would appear to be in many respects unsatisfactory. In the Northern Circle six Foresters, one of whom obtained the Ranger's certificate,

returned during the year from the Forest School, and one Ranger and one Forester were sent to the School.

Burma.—There is nothing of special interest or importance to record as regards the establishment of the Circles in Lower Burma. One officer joined the province from Cooper's Hill, and the Dehra School provided one Sub-Assistant Conservator. The cost of permanent and temporary establishment incurred was respectively R1,08,514 and R47,042. In Upper Burma two recruits from England joined during the year; one officer of Upper Control was transferred to India, and a Sub-Assistant Conservator was appointed from Dehra Dun. The cost of the establishment of all kinds was R69,233. The Government of India after the close of the year recorded their appreciation of the good work done by officers of all grades in both Upper and Lower Burma.

Assam.—The establishment, which is reported to be inadequate, underwent no change in strength during the year. The protection of the forests was upon the whole successfully carried out, and proposals were submitted for an increase of the Executive and Protective staffs. A new Forest Regulation, to replace the Indian Forest Act, was passed shortly after the close of the year.

Coorg.—During the year the Government of India sanctioned the transfer of all temporary establishment to the permanent cadres, and the scale of pay was also slightly raised so as to be more in accord with that adopted in other provinces. In the Executive and Subordinate staffs changes, amounting to 33 per cent. of the total strength, took place owing to deaths or resignations, and the Forest Officer reported that great difficulty was experienced in recruiting Forest Guards.

Ajmere.—The establishment underwent no change and performed its duties satisfactorily.

Baluchistan.—It would appear that no complaint was found with the conduct of the existing subordinate staff, but the Forest Officer reported that work could not be satisfactorily conducted under present conditions as there are no trained Rangers or Foresters in the Division, the result being that the Forest Officer has to superintend the execution of petty works.

Andamans.—The Executive staff was increased during the year under the orders of the Government of India, but it was reported that it is difficult to procure qualified men to fill the sanctioned posts. Practically no Protective staff is entertained.

Berar.—A trained officer from Cooper's Hill joined his appointment during the year, and an additional appointment of Sub-Assistant Conservator was sanctioned, but the post was not filled. The Subordinate staff was reported to be below the requisite strength, and proposals for its increase were under consideration. A European Ranger was prosecuted and convicted for criminal misappropriation of money.

Madras.—No change of any moment took place in the establishment; but, after the close of the year, proposals for increasing and re-organizing the superior and subordinate establishments were sanctioned. The sanctioned increase is to be entertained by degrees, and the re-organization will result in all probability in a marked improvement as regards forest protection, and in a material enhancement of the revenue.

Bombay.—No changes of any importance took place during the year in the constitution of the establishment.

II.—Experiments and Exotics.

23. The following extracts contain the information given in the Annual Reports regarding experimental cultivation :—

Bengal.—The experiments mentioned in the last Review in respect of *Cryptomeria Japonica* were continued, but with so little success that their discontinuance has been ordered. In Chittagong padouk seed was sown as an experiment, apparently with considerable success. A further supply of mahogany seed was sown at Babuchat, which germinated profusely, and the success of the experiment was such that it was intended to transplant a number of seedlings into the forests during the rains of 1891. The experiments with this species in the Buxa Division proved unsuccessful.

North-Western Provinces and Oudh.—In the Central Circle experiments to determine the coppicing power of *sâl, shisham,* and *khair* were carried out. These, in the case of sâl, afforded interesting results, which are recorded in the Conservator's report. The experiment with *khair* pointed to the conclusion that this species pollards better than it coppices. Experiments in regard to the annual girth-increment of sâl were also conducted in the sub-montane forests of this and the Oudh Circle. Various minor experiments were made in the latter Circle. Nothing has been recorded under this head in the report for the School Circle.

Punjab.—Exotic species, introduced in previous years, were reported to have made progress, but no new experiments were initiated by Divisional Officers. At the suggestion of the Inspector General of Forests a large quantity of the seed of *Robinia* was obtained from Italy, and of *Albizzia* from Australia, and was distributed for sowing in various localities. The seed did not reach the officers concerned at the proper time for sowing, and the result of the experiment has not been, generally speaking, encouraging. It would appear, however, that these species could be introduced under more favourable conditions in various parts of the province, and the experiments are to be continued. The seed of a number of kinds of *Eucalypti* and other species were also received from Australia through the Inspector General of Forests, but complete results are not yet known.

Central Provinces.—Little was done under this head. The experimental fence of *Opuntia*, referred to in the Review for 1889-90, was a failure. In the Southern Circle the few remaining mahogany trees in the Bilaspur Division died during the year. Nothing has been recorded in the report for the Northern Circle.

Burma.—In the report for the Tenasserim Circle the progress and history of a number of minor experiments with various species have been recorded in the Conservator's report. After many experiments, fully-flavoured vanilla pods were obtained during the year. Nothing of special interest has been recorded in the report for the Pegu Circle. In Upper Burma the interesting experiments with exotic trees at Barnardmyo. and Mogok were continued; the area operated upon was extended, and blanks replanted with *Cupressus Torulosa*, *Pinus longifolia*, and *Quercus glauca*. It was reported that *Pinus longifolia* appeared to thrive no better than the indigenous-related species, *Pinus Khasya*, and that further experiments with the former species appear unnecessary. A large number of deodar transplants were put out at Barnardmyo, and such as have not died are healthy and growing vigorously.

Assam.—Nothing has been recorded and no work was apparently undertaken under this head in these forests.

Coorg.—The Deputy Conservator reported that there was nothing of interest to note upon as regards this subject.

Ajmere.—The experimental sowings of bamboos were continued, and the seeds germinated well. There were some two hundred plants in the nurseries which had attained a height of from 2 to 5 feet in the course of a single year.

Baluchistan.—The seeds of a number of European species were procured and sown during the year, but, with some slight exceptions, the experiments did not succeed. Seeds of various Himalayan trees were also sown. The seeds of fruit trees and also of *Pinus excelsa* and *Æsculus indica* germinated well. Those of most of the other species failed to germinate. A consignment of young Himalayan trees, including fruit trees, was obtained from Simla and either distributed on sale or planted out: of those planted the majority did well.

Andamans and Berar.—No work in this direction appears to have been undertaken during the year.

Madras.—The results of experiments with exotics are contained in the Conservator's reports. Various species of dates were tried which failed in some districts and succeeded in others, so that the experiments are inconclusive. It was reported that the *Eucalyptus* does not succeed in the plains, but grows fairly at medium elevations. Various experiments were made with bamboos. *Dendrocalamus longispathus*, obtained from Burma, was introduced with fair success at Chingleput, while *Dendrocalamus Brandisii* did well in North Malabar. The introduction of the mahogany was tried in various districts, and partially succeeded.

Bombay.—The experiments made in Bombay are mainly in connection with the introduction of the date-palm, in regard to which partial success has been recorded.

III.—Exports of Forest-produce.

24. The following statement exhibits the sea-borne exports of forest-produce from India to Foreign Countries in 1890-91 :—

Articles.	Quantity in tons of 20 cwts.; in the case of teak, cubic tons.		Valuation at port of shipment in 1890-91.	
	Average of five years, (1885-86 to 1889-90).	In 1890-91.	Total.	Per ton.
			R	R
Caoutchouc	420	456	11,73,175	2.573
Shell-lac	5,028	5,625	59,48,599	1.058
Lac-dye	36	8	5,018	627.
Sandalwood, Ebony and other ornamental woods.	Information	not available	8,00,763	...
Cutch and Gambir	11,907	7,825	23,63,549	302
Myrabolams	33,925	32,760	30,07,143	92
Teak	47,684	42,805	42,53,032	99
Cardamoms	114	78	1,89,277	2,427
Total in 1890-91	...	...	1,77,40,556	...
Total in 1889-90	...	...	1,98,42,161	...
Decrease in 1890-91	...	...	21,01,605	...

IV.—Forest Administration in Native States.

25. As might have been anticipated, the steadily increasing progress and success in the administration of the State forests in British India, and doubtless the constantly growing, important and permanent revenue realised from this property under the organized control of the Forest Department, has attracted the attention of the more advanced rulers of Native States, and has gradually led to the introduction of similar efforts under the auspices of the more enlightened Durbars.

At the outset, the want of professionally educated Forest officers was naturally felt, and the resources of the Government of India were indented upon. These demands were liberally responded to, in spite of the fact that the Supreme Government itself still laboured under the disadvantage of insufficiently filled cadres in almost every province.

In order to assist Native States in the organization of technically-trained establishments of their own, the Forest School at Dehra Dun was also thrown open to candidates from Native States, who, being admitted without fees, receive the same training as that given for the Provincial Forest Service under the Government of India. Considerable advantage has already been taken of this concession.

The progress made in the forest administration of Native States, as a result of these measures, is now sufficient to warrant more detailed notice by the Inspector General of Forests in future reviews—an opportunity for which, it is hoped, the Durbars will see fit to avail themselves by sending copies of their Forest Administration Reports for remarks.

V.—Technical Education.

26. The Indian Forest Service will in future be solely recruited by officers appointed under covenant with the Secretary of State and who have received a professional training. Up to the year under review 133 professionally-trained officers have joined the Service from Europe. Twenty-six of these were trained

in Germany, 72 in France, and 35 at Cooper's Hill College. Twenty per cent, however, have already died or left the Department, though the recruitment began only little more than 20 years ago. Eleven recruits came out from Cooper's Hill in 1890-91, and 26 were studying at the College. The course of training has been prolonged to 3 years. In the opinion of the Inspector General of Forests, however, the advantage gained thereby has to a certain extent been counteracted by changes which have been introduced in the entrance examination for the Service.

One hundred and ninety-eight students have passed out of the Imperial Forest School at Dehra Dun during the first ten years of its existence. Of these, 27 were deputed by Native States. During this period 147 obtained the higher and 51 the lower certificate. Of late the attendance at the School has greatly increased, and during 1890-91 80 scholars were in attendance, of whom 16 belonged to Native States.

The rules under which officers already in the Department can, when on furlough, study the progress of forestry in Europe have been considerably improved during the year.

APPENDICES.

STATE

Summary of the Revenue and Expenditure of the Forest

Budget Heads.	Bengal Presidency (British Territories).										
	Imperial.	Bengal.	North-Western Provinces and Oudh.	Punjab.	Central Provinces.	Lower Burma.	Upper Burma.	Assam.	Coorg.	Ajmere.	Baluchistan.
REVENUE.	R	R	R	R	R	R	R	R	R	R	R
I.—Timber and other produce removed from the forests by Government agency.	...	79,880	6,53,153	5,24,186	88,005	16,02,580	58,346	4,085	90,641	...	4,595
II.—Timber and other produce removed from the forests by consumers or purchasers.	6,370	6,11,873	9,17,105	2,73,128	10,93,114	7,47,129	15,48,004	2,68,547	44,438	14,053	2,995
III.—Drift and waif wood and confiscated forest produce.	...	16,790	35,497	10,091	5,186	1,09,759	16,413	2,422	...	...	9
IV.—Revenue from forests not managed by Government.	...	...	14,110	2,728	7,222	1,85,539	...	12,207	...	...	8,009
V.—Miscellaneous . . .	...	18,849	18,014	24,237	19,934	32,664	21,534	39,532	482	1,213	116
Total Revenue .	*6,370	7,27,392	16,37 879	8,34,370	12,13,461	26,77,671	16,44,297	3,26,793	1,35,561	15,266	15,724
EXPENDITURE.											
A.—Conservancy and Works.											
I.—Timber and other produce removed from the forests by Government agency.	...	50,720	3,33,903	2,38,190	20,387	5,20,334	4,530	8,053	17,031	...	3,348
II.—Timber and other produce removed from the forests by consumers or purchasers.	...	41,210	38,637	1,568	97,175	10,525	8,974	13,341	477	...	655
III.—Drift and waif wood and confiscated forest produce.	...	4,642	10,890	6,66[illegible]	19	43,909	15,385	215	...	...	...
IV.—Revenue from forests not managed by Government.	...	...	1,384	...	...	6,687	...	583	...	...	...
V.—Rent of leased forests, and payments to shareholders in forests managed by Government.	...	...	11,689	37,152	251	...	...	...	...	...	...
VI.—Live-stock, stores, tools and plant.	...	13,234	28,313	11,823	9,755	26,314	28,868	22,146	748	49	246
VII.—Communications and buildings.	...	21,657	87,823	14,317	11,182	17,295	10,647	11,718	1,644	788	676
VIII.—Demarcation, improvement and extension of forests.	...	41,929	74,106	49,427	1,71,270	1,46,904	15,733	74,801	16,411	1,926	2,297
IX.—Miscellaneous . . .	...	9,635	20,615	3,479	4,692	4,986	3,054	14,030	364	...	2,026
Total A.—Conservancy and Works.	...	1,83,027	6,07,360	3,62,623	3,14,781	7,76,954	87,191	1,44,887	36,675	2,763	9,248
B.—Establishments.											
I.—Salaries	45,131	1,90,405	2,60,902	2,33,587	3,76,185	2,59,973	1,84,106	1,14,273	25,133	8,109	17,015
II.—Travelling allowances . .	10,506	31,447	34,662	35,091	23,598	41,244	26,650	19,191	2,912	1,213	2,478
III.—Contingencies . . .	3,137	9,125	16,271	21,740	21,040	8,303	4,368	5,501	1,098	545	709
Total B.—Establishments .	58,774	2,30,977	3,11,835	2,90,418	4,20,823	3,09,520	2,15,124	1,38,965	29,143	9,957	20,202
Charges in England . .	20,080	...	...	...	...	...	...	...	...	...	...
Exchange on England .	6,560	...	...	...	...	...	...	...	...	...	...
Grand Total of Expenditure.	‡ 85,414	4,14,00	9,19,195	6,53,041	7,35,554	10,86,474	3,02,315	2,83,852	65,818	12,720	29,450
Surplus .	...	3,13,388	7,18,684	1,81,329	4,77,907	15,91,197	13,41,982	42,941	69,743	2,546	...
Deficit .	79,044	...	...	...	...	...	...	...	...	...	13,726

* Includes certain undistributable

† Includes R3,976 on account of "Payments

‡ Includes pay of Inspector General of Forests, certain home

MENT I.

Department in India for the year 1890-91.

Andamans.	Forest School.	Forest Surveys (Imperial).	Total Bengal Presidency (British Territories).	Madras.	Bombay.	Total British Provinces.	Berar.	Forest Surveys (Berar).	Grand Total.	BUDGET HEADS.
R	R	R	R	R	R	R	R	R	R	REVENUE.
1,55,848	...	...	32,61,319	4,17,744	16,95,862	53,74,925	...	...	53,74,925	I.—Timber and other produce removed from the forests by Government agency.
2,175	...	...	55,28,931	13,24,281	14,85,952	83,39,164	4,85,767	...	88,24,931	II.—Timber and other produce removed from the forests by consumers or purchasers.
...	...	...	1,96,167	10,186	10,170	2,16,523	474	...	2 16,997	III.—Drift and waif wood and confiscated forest produce.
...	...	...	2,29,815	55	33,144	2,63,014	...	...	2,63,014	IV.—Revenue from forests not managed by Government.
303	1,184	2,104	1,80,166	43,142	63,092	2,86,400	868	...	2,87,268	V.—Miscellaneous.
1,58,326	1,184	2,104	93,96,398	17,95,408	32,88,220	1,44,80,026	4,87,109	...	1,49,67,135	Total Revenue.
										EXPENDITURE.
										A.—CONSERVANCY AND WORKS.
77,478	...	...	12,73,974	1,82,989	7,01,654	21,58,617	...	...	21,58,617	I.—Timber and other produce removed from the forests by Government agency.
137	...	...	2,12,699	77,839	38,305	3,28,843	24,458	...	3,53,301	II.—Timber and other produce removed from the forests by consumers or purchasers.
...	...	...	81,727	3,261	175	85,163	...	...	85,163	III.—Drift and waif wood and confiscated forest produce.
...	...	...	8,654	...	171	8,825	...	...	8,825	IV.—Revenue from forests not managed by Government.
...	...	...	49,092	16,651	30,164	95,907	15,558	...	1,11,465	V.—Rent of leased forests, and payments to shareholders in forests managed by Government.
21,505	1,737	1,621	1,66,359	27,264	3,361	30,625	5,701	...	2,02,685	VI.—Live-stock, stores, tools and plant.
17,359	...	...	1,95,106	68,940	10,419	2,74,464	14,844	...	2,89,308	VII.—Communications and buildings.
1,214	...	5,808	6,01,826	2,66,229	2,15,054	10,83,109	10,988	...	10,94,097	VIII.—Demarcation, improvement, and extension of forests.
786	3,018	...	66,685	14,280	24,642	1,05,607	973	...	1,06,580	IX.—Miscellaneous.
1,18,479	4,755	7,429	26,56,122	6,57,453	10,23,945	43,37,520	72,522	...	44,10,042	Total A.—Conservancy and Works.
										B.—ESTABLISHMENTS.
10,048	24,590	13,004	17,62,551	4,64,885	6,89,687	29,17,123	78,701	...	29,95,824	I.—Salaries.
1,320	3,052	446	2,33,810	98,135	1,01,011	4,32,956	12,523	...	4,45,479	II.—Travelling allowances.
205	2,794	3,445	98,281	26,440	† 55,244	1,79,965	5,175	...	1,85,140	III.—Contingencies.
11,573	30,436	16,895	20,94,642	5,89,460	8,45,942	35,30,044	96,399	...	36,26,443	Total B.—Establishments.
...	...	...	20,080	...	...	20,080	...	...	20,080	Charges in England.
...	...	...	6,560	...	...	6,560	...	...	6,560	Exchange on England.
1,30,052	35,191	24,324	47,77,404	12,46,913	18,69,887	78,94,204	1,68,921	...	80,63,125	Grand Total of Expenditure.
28,274	...	...	46,18,994	5,48,495	14,18,333	65,85,322	3,18,188	...	69,04,010	SURPLUS.
...	34,007	22,220	...	...	...	...	...	...	...	DEFICIT.

and petty local items.
to officers of other Provinces."
charges, and undistributable and petty local items.

STATEMENT II.*

Revenue, Expenditure, and Surplus of the Forest Department throughout India during the 25 years from 1866-67 to 1890-91.

REVENUE.

Provinces	1866-67	1867-68.	1868-69.	1869-70	1870-71.	1871-72	1872-73.	1873-74.	1874-75	1875-76	1876-77	1877-78.	1878-79	1879-80.	1880-81	1881-82	1882-83.	1883-84.	1884-85	1885-86.	1886-87.	1887-88.	1888-89.	1889-90.	1890-91.
	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Imperial†	752	583	1,159	1,836	3,107	2,334	2,771	1,225	1,144	1,465	2,480	1,36,772	16,716	17,214	18,887	27,487	30,732	32,987	26,574	14,708	4,186	4,817	4,617	4,759	6,370
Bengal	45,590	56,039	79,715	2,44,657	1,03,249	1,44,719	1,49,852	1,79,366	1,85,932	1,98,274	2,22,401	4,26,228	4,16,027	4,49,524	5,61,340	6,33,738	6,93,559	6,94,334	5,71,152	5,97,432	6,53,634	6,57,794	6,76,907	7,68,718	7,27,392
North-Western Provinces and Oudh	7,79,201	5,98,503	7,85,210	8,32,945	4,24,257	11,70,900	19,39,115	19,32,677	13,63,358	12,68,356	11,50,671	12,03,108	11,26,755	10,39,966	9,42,228	10,65,094	10,13,403	16,11,383	15,72,319	14,61,495	15,73,556	12,47,454	14,62,832	17,14,159	16,37,879
Punjab	3,96,050	2,80,510	3,44,882	3,94,129	9,47,236	7,10,216	6,52,995	7,32,539	8,34,874	9,09,831	5,98,754	6,83,711	5,00,619	6,49,819	6,71,678	6,88,308	7,66,709	9,10,177	7,49,352	8,50,419	11,27,277	7,86,936	10,45,768	9,21,713	8,34,370
Central Provinces	2,37,472	3,49,490	3,50,536	4,16,020	6,58,129	5,57,128	4,81,673	5,63,367	6,60,938	7,26,176	6,61,228	6,83,910	8,52,862	10,06,724	8,50,139	11,72,894	9,77,617	9,94,769	10,27,202	10,38,894	9,57,410	10,93,369	11,80,405	11,56,181	12,13,461
Burma (Lower)	4,24,774	6,46,812	8,17,599	9,84,774	8,18,124	7,72,400	8,27,569	10,68,621	10,74,802	17,79,020	15,51,408	16,08,082	11,37,562	11,80,190	15,16,613	22,31,804	25,03,886	25,09,275	16,70,982	20,23,859	19,98,867	22,18,897	26,09,305	31,34,716	26,77,671
Burma (Upper)	...	...	..	...	...	...	.	...	...	...	...	..		-	...	...	..	...		...	1,08,074	2,96,876	15,73,928	18,06,070	16,44,297
Assam	...	..	..	...	...	...	...	...	65,949	61,870	82,568	1,38,326	1 61 779	1,64,335	1,68,997	1 66,054	2,48,605	2,11,445	1,80,414	1,98,656	2,12,011	2,67,312	3,03,882	3,79,498	3,26,798
Coorg	32,568	79,082	98,496	1,03,135	72,144	92,468	84,125	1,10,284	58,015	1,07,460	75,927	1,01,015	52,020	1,01,786	87,857	1,00,364	1,38,022	87,822	1,13,233	89,386	99,291	1,27,028	1,36,183	92,753	1,35,98
Ajmere	...		.	...	...	...	21	304	202	410	905	3,002	1,241	1,861	1,124	4,065	7,126	8,198	10,456	9,697	11,274	14,293	13,574	11,598	15,266
Forest Surveys (Imperial)	...	..	.	..	...	-	.	...	...	21	...	-	63	38	272	...	348	36	294	202	241	40	315	290	2,109
Forest School	...	...	.	...	...	...	.	..	...	...	...	...	...	...	...			...	73	273	415	777	449	1,237	1,194
Andamans	3,495	6,070	5,071	3,036	7,373	5,880	6,862	4,184	5,516	5,363	4,679	1,301	5,564	2,437	27,734	48,407	70,858	24,762	12,213	23,944	31,870	1,04,088	1,06,075	1,62,195	1,58,326
Total	19,19,842	20,03,048	26,73,688	29,85,132	30,33,610	34,56,043	41,45,286	45,97,567	42,50,730	50,54,246	43,50,129	49,76,455	42,71,208	46,13,894	48,46,869	61,39,121	64,51,305	70,85,108	59,44,204	63,04,965	67,77,908	68,19,685	91,10,610	1,01,53,811	98,80,674
Madras	4,48,110	5,81,342	5,29,185	6,97,699	5,33,412	5,76,261	5,95,188	6,13,653	5,14,401	6,77,873	5,92,573	5,50,310	6,06,788	6,25,168	7,36,880	8,06,908	9,06,442	9,53,704	11,66,916	11,98,650	12,46,911	13,74,920	15,15,006	15,57,627	17,95,408
Bombay	8,21,268	8,94,244	12 13,483	12,35,257	11,68,401	11,50,215	11,46,405	11,88,089	12,24,051	12,48,672	12,26,658	12,61 528	11,81,894	15,24,712	15,22,807	18,23,117	20,90,353	25,03,100	27,74,842	33,66,286	30,32,676	30,32,577	22,50,190	31,37,696	32,88,220
Total (British India)	31,89,220	34,68,635	42,16,336	49,18 083	47,35,423	51,82,519	58,86,879	63,99,309	59,89,182	69,80,791	61,69,360	67,88,293	60,59,890	62,64,774	71,06,556	87,74,146	94,48,100	1,05,41,912	98,85,982	1,08,69,901	1,10,57,493	1,12,27,182	1,34,84,606	1,48,49,134	1,44,64,302
Berar	43,574	53,440	84,557	1,80,397	1,77,322	1,55,543	2,58,563	2,63,256	2,60,674	2,32,782	2,53,072	2,79,236	2,88,704	8,07,500	2,66,556	2,33,511	2,92,014	3,08,218	2,97,185	3,19,851	3,26,261	4,06,447	4,07,977	4,40,541	4,87,109
Forest Surveys (Berar)	...	.	.	.	...	..	...	...	...	...	...	..	...	...	...	...	...		934	631	651	595	...	...	
Baluchistan	...	...	...	...	..	...	..	...	...	...	...	...	...	...	14,376	18,616	5,039	4,752	6,089	14,952	14,081	14,863	5,689	13,897	15,724
Grand Total	32,32,794	35,22,075	43,00,893	50,98,485	49,12,752	53,38,062	61,43,442	66,62,565	62,49,856	72,13,573	64,22,432	70,67,529	63,48,594	70,72,274	73,87,488	90,26,273	97,45,153	1,08,54,882	1,01,90,170	1,12,05,345	1,13,98,886	1,16,48,388	1,38,98,453	1,53,03,572	1,49,67,135

* The figures in this statement have been revised by the Comptroller and Auditor General.
† Includes certain home receipts and undistributable and petty local items.

STATEMENT II—*continued.*

EXPENDITURE.

Provinces.	1866-67.	1867-68.	1868-69.	1869-70.	1870-71.	1871-72.	1872-73.	1873-74.	1874-75.*	1875-76.	1876-77.	1877-78.	1878-79.	1879-90.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	1888-89.	1889-90.	1890-91.
	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Imperial*	32,078	38,928	33,007	54,106	51,423	66,530	67,150	79,216	81,210	48,239	44,004	98,099	63,956	73,810	65,291	77,635	87,263	98,266	96,306	88,245	86,299	78,626	86,199	81,311	85,41
Bengal	1,05,215	1,67,495	1,15,933	1,17,890	86,479	1,10,989	1,00,777	1,39,274	1,01,361	1,42,676	2,14,497	2,62,913	3,38,675	2,75,748	3,35,381	3,94,612	3,82,183	3,87,813	4,11,915	3,78,399	4,22,781	3,90,368	3,76,270	3,98,150	4,14 004
North-Western Provinces and Oudh	4,10,205	3,89,806	5,01,021	5,29,422	8,10,073	11,10,071	11,74,666	11,90,794	10,61,302	7,36,979	8,61,382	7,28,926	8,08,977	7,16,594	6,79,574	9,16,212	8,39,025	10,41,885	10,20,101	9,74,519	9,19,580	8,20,748	8 44,544	9,63,151	9,19,195
Punjab	2,63,373	2,88,029	3,17,634	7,41,432	11,95,655	7,07,619	8,90,369	6,11,556	6,58,983	5,56,911	5,25,659	5,20,631	5,23,554	4,80,676	4,95,368	5,16,269	5,60,750	6,53,146	5,58,070	6,75,483	7,16,510	6,77,912	5,93,885	6,45,855	6,53,041
Central Provinces	1,49,408	2,18,434	3,19,126	4,74,930	3,17,928	2,31,633	2,50,578	2,85,939	2,94,449	3,73,327	2,90,295	3,22,034	3,93,758	5,22,574	4,95,512	4,97,013	4,12,297	4,36,058	4,95,821	4,45,432	4,99,293	5,52,939	6,68,697	6 96,445	7,35,554
Burma (Lower)	2,86,993	3,30,526	4,24,333	4,22,106	4,00,851	3,79,217	3,36,759	4,75,304	6,63,547	8,15,659	10,05,554	8,53,231	7,18,402	7,53,490	7,12,568	11,50,224	12,28,955	12,17,824	12,12,233	11,50,952	10,75,830	10,32,694	12 31 944	13 32 844	10,86,474
Burma (Upper)	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	2,188	1,21 152	7,85,129	2,73 800	3,02,315
Assam	...	...	...	...	...	...	...	...	60,367	63,397	90,520	1,01,153	1,26,028	1,32,829	1,42,725	1,65,361	1,71,823	1,99,562	1,97,696	2,11,494	2,12,287	2,26,892	2,09,905	2,57,129	2,83,852
Coorg	8,650	13,722	17,948	33,084	24,747	70,178	29,478	45,952	37,999	40,168	33,692	36,268	34,829	55,165	56,487	58,796	64,770	75,023	76,951	65,690	74,068	72,629	80,175	72,420	65,818
Ajmere	...	...	...	...	...	...	13,054	17,932	15,281	27,346	22,460	14,926	13,445	13,750	12,423	13,954	11,284	14,574	16,316	16,469	20,744	18 897	15,676	12,701	12,720
Forest Surveys (Imperial)	...	...	...	...	...	...	...	59,556	78,090	58,930	58,929	60,165	60,325	46,878	40,335	42,483	41,595	30,940	19,823	19,180	28,348	32 868	22,164	21,188	24,324
Forest School	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	22,568	24,239	30,831	33,129	32,961	29,646	35,191
Andamans	...	...	...	150	...	1,651	1,896	...	...	...	1,307	1,098	...	7,177	2,160	2,306	1,840	12,161	22,760	37,635	25,769	62,679	57,295	94,975	1,30,052
Total	12,56,922	14,46,935	17,28,902	23,73,100	28,87,156	26,79,888	28,64,728	29,05,523	30,52,589	28,63,632	31,48,279	30,04,442	30,82,949	30,72,691	30,37,324	38,35,871	38,01,740	41,67,252	41,50,563	40,79,137	41,14,548	41,31,532	50,04,844	48,79 615	47,47,954
Madras	3,42,827	4,02,674	4,01,617	4,21,316	4,47,267	3,91,921	5,48,746	4,74,920	5,95,941	5,92,039	6,35,360	5,65,624	4,95,914	5,48,527	5,19,270	6,03,419	6,45,352	7,86,733	8,96,505	9,37,972	11,53,122	11,29,212	12,20,794	11 61,237	12,46,913
Bombay	6,51,611	5,55,039	6,31,226	5,56,015	6,39,759	5,97,331	7,25,031	7,21,594	8,36,675	7,94,141	8,38,979	8,77,716	10,04,923	10,76,989	11,67,347	11,69,181	12,78,770	15,64,172	17,78,722	18,38,461	19,52,910	19,44,005	16,93,962	17 70,691	18,69,887
Total (British India)	22,50,390	24,04,649	27,61,745	33,50,440	39,74,182	36,67,646	41,38,505	41,02,037	44,85,205	42,49,812	46,22,618	44,47,782	45,83,786	47,98,207	47,24,471	56,08,471	57,25,862	65,18,157	68,25,791	68,56,570	72,20,580	72,04,750	79,19,600	78,11,543	78,64,754
Berar	13,718	18,669	34,105	81,569	81,972	1,00,829	83,631	86,350	91,389	91,449	96,652	1,08,968	1,07,350	1,10,506	1,28,968	1,52,985	1,55,054	1,56,779	1,52,619	1,59,242	1,71,704	1,83 765	1,70 212	1,76,549	1,68,921
Forest Surveys (Berar)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	15,043	34,804	42,940	45,472	42,098	23,955	6,464	...
Baluchistan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	16,416	17,682	11,962	16,911	13,266	15,799	17,836	17,753	15,994	17,962	29,450
Grand Total	22,64,108	24,23,318	27,95,850	33,32,009	40,56,154	37,68,475	42,22,136	41,88,387	45,76,594	43,41,311	47,17,470	45,57,750	46,91,136	48,08,713	48,69,825	57,79,138	58,92,878	67,06,890	70,26,510	70,74,551	74,35,592	74,48,366	81,29,761	80,12,518	80,63,125

* Includes pay of Inspector General of Forests, certain home charges, and undistributable and petty local items.

STATEMENT II—*concluded.*

SURPLUS.

Provinces.	1866-67.	1867-68.	1868-69.	1869-70.	1870-71.	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	1888-89.	1889-90.	1890-91.
	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Imperial*	−31,326	−38,381	−31,848	52,670	−48,316	−64,196	−64,379	−77,961	−80,066	−46,774	−41,514	38,673	−47,240	−56,596	−46,404	−50,228	−56,536	−65,359	−69,732	−73,537	−82,113	−73,779	−82,182	−76,552	−79,044
Bengal	−59,625	−1,11,456	−45,218	1,26,758	16,770	33,730	49,075	40,092	84,571	55,598	7,904	1,63,315	77,352	1,73,776	2,25,959	2,39,122	3,11,776	3,06,521	1,59,237	2,27,033	2,30,853	2,67,426	3,00,637	3,70,568	3,13,388
North-Western Provinces and Oudh	3,68,996	1,94,697	2,84,189	3,03,523	−3,85,816	60,829	7,64,449	7,41,883	3,02,056	5,27,377	2,89,309	4,74,182	3,16,778	3,23,372	2,62,654	1,49,882	1,74,378	5,69,498	5,52,218	4,86,976	6,53,976	4,16,706	6,18,258	7,51,008	7,18,684
Punjab	1,32,677	−7,589	27,248	−3,47,303	−2,48,419	2,597	−2,37,374	1,20,983	1,75,891	3,52,920	73,095	1,63,080	−22,935	1,69,143	1,76,310	1,72,039	2,05,959	2,57,031	1,91,282	1,74,936	4,10,767	1,09,024	4,51,883	2,75,858	1,81,329
Central Provinces	88,064	1,31,056	31,410	−58,910	3,40,192	3,25,495	2,31,095	2,82,428	3,66,489	3,52,849	3,71,031	3,61,876	4,59,104	4,84,150	3,54,627	6,75,871	5,65,400	5,58,711	5,31,381	5,91,462	4,58,117	5,40,430	5,11,708	4,59,736	4,77,900
Burma (Lower)	1,37,781	3,16,286	3,93,266	5,62,668	4,17,273	3,93,183	4,90,810	5,93,317	4,11,255	9,63,361	5,45,854	7,44,851	4,19,160	4,26,700	8,04,045	10,81,580	12,74,941	12,91,451	4,58,749	8,72,907	9,22,837	11,86,203	13,77,361	18,01,872	15,91,197
Burma (Upper)	...		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,05,886	1,75,724	7,94,799	15,32,270	13,41,992
Assam	...		...	...	...	...	...	...	5,582	−1,527	−8,952	33,173	35,751	31,506	26,272	693	76,782	11,883	−17,285	−14,838	−276	40,420	93,977	1,22,369	42,941
Coorg	23,858	95,360	80,648	75,071	47,397	22,288	54,916	64,332	20,016	67,292	42,235	64,747	17,191	46,621	31,370	40,568	73,252	12,799	36,282	23,696	25,203	54,399	56,008	20,333	69,743
Ajmere	...	...	...	...	...	...	−13,030	−17,628	−15,079	−26,936	−21,555	−11,924	−12,204	−11,889	−11,299	−9,889	−4,158	−6,376	−5,860	−6,772	−9,470	−4,604	−2,102	−1,109	2,546
Forest Surveys (Imperial)	...	...	...	...	...	...	...	59,556	−78,090	−58,909	−58,929	−60,165	−60,282	−46,840	−40,063	−42,489	−41,247	−30,904	−19,589	−18,978	−28,107	−32,828	−21,849	−20,968	−22,220
Forest School	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	−22,495	−23,966	−30,416	−32,352	−32,512	−28,409	−34,007
Andamans	3,495	6,070	5,071	2,886	7,373	4,229	4,966	4,181	5,516	5,363	3,372	205	5,564	−4,740	25,574	46,101	69,018	12,601	−547	−13,091	6,101	41,383	48,780	67,220	28,274
Total	6,63,920	5,56,113	7,44,766	6,12,023	1,46,454	7,78,155	12,80,558	16,92,044	11,98,141	21,90,614	12,01,850	19,72,013	11,88,259	15,35,203	18,09,045	23,03,250	26,49,565	29,17,856	17,93,641	22,25,828	26,63,358	26,88,152	41,14,766	52,74,196	46,32,720
Madras	1,05,283	1,78,668	1,27,568	2,76,333	86,145	1,84,340	46,442	1,38,733	−81,540	85,834	−42,987	−15,314	1,10,874	76,641	2,17,610	2,03,489	2,61,090	1,66,971	2,70,411	2,60,678	93,789	2,45,708	2,94,212	3,96,890	5,43,495
Bombay	1,69,627	3,29,205	5,82,257	6,79,242	5,28,642	5,52,384	4,21,374	4,66,495	3,87,376	4,54,531	3,87,679	3,83,812	1,76,971	4,47,723	3,55,460	6,58,936	8,11,583	9,38,928	9,96,119	15,26,825	10,79,766	10,88,572	11,56,228	13,67,006	14,18,333
Total (British India)	9,38,830	10,63,986	14,54,591	15,67,648	7,61,241	15,14,879	17,48,374	22,97,272	15,03,977	27,30,979	15,46,542	23,40,511	14,76,104	20,60,567	23,82,115	31,65,675	37,22,238	40,23,755	30,60,171	40,13,331	38,36,913	40,22,432	55,65,206	70,37,591	65,99,548
	29,856	34,771	50,452	98,828	95,357	54,714	1,72,932	1,76,906	1,69,285	1,41,283	1,58,420	1,69,268	1,81,354	1,96,994	1,37,588	80,526	1,36,960	1,51,439	1,44,536	1,60,609	1,54,552	2,22,682	2,37,765	2,63,992	3,18,188
Forest Surveys (Berar)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	−15,043	−33,870	−42,309	−44,821	−41,502	−23,955	−6,464	...
Baluchistan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	−2,040	934	−6,923	−12,159	−7,177	−837	−3,755	−3,690	−10,326	−4,065	−13,726
Grand Total	9,68,686	10,98,757	15,05,043	16,66,476	8,56,598	15,69,593	19,21,306	24,74,178	16,73,262	28,72,262	17,04,962	25,09,779	16,57,458	22,57,561	25,17,663	42,47,135	38,52,275	41,47,992	31,63,660	41,30,794	39,42,894	41,99,922	57,68,690	72,91,054	69,04,010

* Includes pay of Inspector General of Forests, certain home charges, and undistributable and petty local items.

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